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THE JOURNAL

OF THE

Department of Agriculture

OF

SOUTH AUSTRALIA.

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FEBRUARY, 1909.

LEADING FEATURES.

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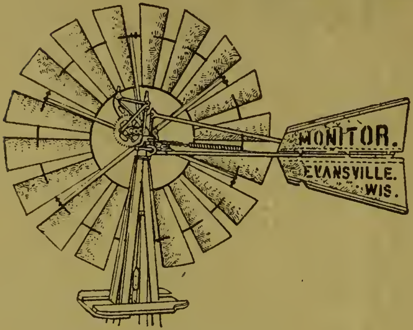

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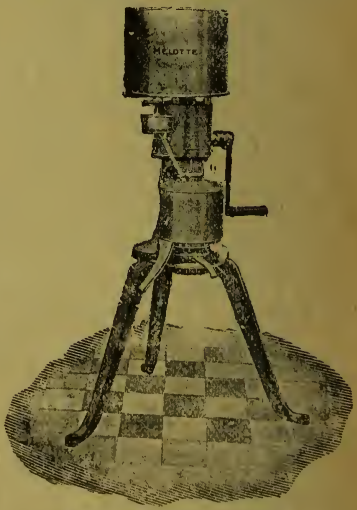

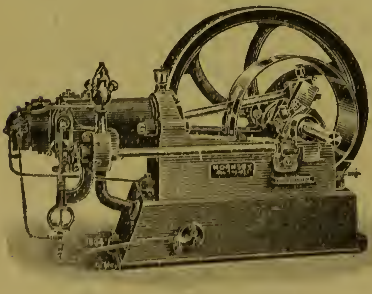

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L. O'LOUGHLIN,
Minister of Agriculture.

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Points for Producers.

The Harvester Commission.

The Royal Commission appointed by the Federal Government to enquire into the price of strippers, harvesters, and seed-drills sat in Adelaide during the early days of February, the Hon. A Poynton, M.H.R. (formerly of the South Australian Parliament) being chairman, and having with him Messrs. Chanter, McDougall, and Sampson, Ms.H.R. The object of the Commission is to give effect ultimately to the new protection, which seeks, by means of the excise duties, to ensure adequate wages to the worker and a fair price being charged to the purchaser. Owing to the recent decision of the High Court, it appears that an amendment of the Federal Constitution will be necessary before the Commonwealth Government can be permitted to differentiate the excise duties charged on the products of various firms according to the rate of wages they pay. The scope of the Commission is very wide, and representatives of the leading manufacturing and importing firms were examined as to the cost of manufacture, rates of wages, etc. Similar evidence has already been taken in Melbourne.

Shipping Wheat through the Produce Depot.

The Government has decided upon an important departure in regard to the shipment of wheat. In future, wheat will be accepted at the Produce Depot in Port Adelaide on consignment for shipment to England in the same way as lambs, fruit, and other produce. The grain will be received at the bulk stores at the Port, shipped to Europe and sold, the seller receiving up to 75 per cent. of the English market value. Those desirous of profiting by the new departure can obtain full particulars on application at the offices of the Produce Export Department, Victoria Square, or at the Depot in Port Adelaide. The Government has had this step in contemplation for some time past, and it will doubtless have a good effect in securing to South Australian farmers a fair price for their produce.

Any farmer who desires to use the Depot must write to ascertain the day on which it will be suitable to receive his wheat. He must then consign his produce to the Depot, where it will be unloaded, stored, and shipped as space offers. The 75 per cent. advance referred to above includes freight and charges, and the farmer can either pay the railway freight himself or it can be paid by the Depot and deducted from his returns. The experiment is at present confined to shipments from Port Adelaide, and it is scarcely probable that it will pay farmers to consign wheat from stations which are at present served by any outport. There will be practically no risk in consigning wheat to the Depot—not as much as there is in the case of lambs sent down for freezing and export, in connection with which such a profitable trade has been built up. It is not the intention of the Government to make any profit out of the transaction, but simply to give the farmers the same fair and equitable treatment which it accords to its other clients at the Depot.

New Weeds.

Two new weeds have been forwarded to us by correspondents. The first comes from near Paskeville, and proves to be *Pallenis spinosa*, a common roadside plant in Mediterranean countries. It belongs to the Composite family, and has the aspect of a thistle, the outer bracts surrounding the flowerhead being long, stiff, and ending in a short, sharp spine. They spread outwards horizontally, giving the open flowerhead a star-like appearance. The flowers are small and yellow, and the whole plant is hairy. The second weed is more likely to prove useful than the *Pallenis*, as it is said to be relished by stock when young. It was forwarded from the neighbourhood of Wolseley, and is the Willow Lettuce, botanically called *Lactuca saligna.* It also belongs to the Composite family, but differs entirely in appearance from the preceding, having small, cylindrical flowerheads clustered along the stiff, twiggy branches. The flowers are small and yellow, and the leaves very narrow, the lowest ones being divided into several narrow lobes, which are often turned backwards, like those of an English dandelion. *Lactuca saligna* is recorded from Victoria in the "Flora Australiensis," so that it must have been introduced into some part of the sister State thirty or forty years ago, but we understand that its appearance in the South-East is comparatively recent. Locally it is called the "Irish Thistle." It is a native of Europe and Western Asia.

In forwarding specimens of the Willow Lettuce, Mr. Geo. Steer, of Wolseley, writes:—"This plant starts to grow as soon as the warm weather sets in, and will keep green all the summer. It stands feeding-off well, and the stock are very fond of it. It is good summer feed for lambs or old ewes. It is spread over a good portion of the east end of the Hundred of Tatiara, and there is some in Victoria, just across the border. It does not spread very quickly, because the stock keep it fed down." Mr. T. L. Truman, Hon. Secretary of the Tatiara Branch of the Bureau, writes confirming Mr. Steer's experience of the plant.

New Poultry Manuals.

The 1903 edition of Mr. D. F. Laurie's "Poultry Manual" has been out of print for some time, and in response to many requests a new edition is now obtainable at the Government Printing Office for 6d., posted 7d. It contains many new features. Particular attention has been paid to the questions of food, housing, and breeding—the three cardinal points of poultry-breeding. The chapter on diseases has been revised, and will be found helpful to those whose methods do not, so far, include prevention. The same author has issued a "Bulletin on Scientific Breeding," being a reprint of a paper contributed to the Congress of the Australasian Association for the Advancement of Science, which recently held its sittings in Brisbane. The practical application of Mendel's law is referred to, and breeders of stock other than poultry will find food for thought therein. The breeder of high-class laying fowls will find explanations and suggestions for future operations. Copies will be forwarded on application to the Poultry Expert.

The Wool Season.

The past season has been a satisfactory one as regards wool, the total number of bales sold in Adelaide from October 1, 1908, to January 30, 1909, being 134,140, as against 120,434 disposed of during the season of 1907-8.

The quantities sold in Adelaide for the past six years (July 1 to June 30) have been as under:—

1903-4	58,483
1904-5	70,612
1905-6	85,496
1906-7	105,551
1907-8	120,434
1908-9 (to date)	134,140

The principal countries of destination for the 1908 clip were as follows:—United Kingdom, 51,625 bales; France, 36,572 bales; Germany, 13,956 bales; Belgium, 9,522 bales; America, 5,173 bales; local and interstate scourers and manufucturers, 17,010 bales.

The total exports of wool from South Australian ports from July 1, 1908, to January 24, 1909, were 146,000 bales, but this included some wool from the Darling country. As regards quality, the clip was well grown and in thoroughly sound condition, burrs and other seeds being less noticeable than of late years.

Kentrophyllum lanatum as Fodder.

Mr. T. L. Truman, Hon. Secretary of the Tatiara Bureau, forwards samples of *Kentrophyllum lanatum*, or Woolly Star Thistle, and writes:—"These were grown at Carow, on Mr. W. Stoude's property. He says it is first-class feed for stock, especially sheep. Back in the nineties, when the drought was so bad, he had one paddock full of these thistles, but not a particle of grass in it. While his neighbours laughed at his thistly paddock, they allowed it was the only paddock about that could produce eatable mutton, as the sheep were all in good fettle. He says that when it is wet with rain you can take hold of them with the naked hand, and at that time stock eat every bit of it, unlike the Scotch thistle, where stock only eat the flower." This is not the first time that the liking of live-stock for this thistle has been noted, especially when other feed is not available. *Kentrophyllum lanatum* has, however, been proclaimed a noxious weed, probably on account of its ferocious spines when mature. Mr. Truman says it bears the local name of "Irish Thistle," while Mr. Geo. Steer, of Wolseley, sends us *Lactuca saligna*, a spineless plant, as bearing the same local appellation, so that there appears to be some confusion on the subject in the Tatiara district.

Farmers' Book-keeping.

We have received from Mr. G. J. Morley a specimen copy of his "Farmers' and Graziers' Complete Book-keeper." This is an effort to reduce accountancy to the very simplest proportions. It contains nineteen large pages, with headings of the various accounts, blank spaces for the entries, and instructions how to make them. The book is, in fact, a ledger, in which the entries are supposed to be booked direct without passing through any waste-book, cash-book, or journal. If the farmer is methodical, and makes his entries neatly, such a system may answer in practice, otherwise it would probably be better to follow the usual custom and have a waste-book, in which the day's entries can be roughly made and afterwards carried forward at leisure. However that may be, Mr. Morley's "book-keeper" should prove useful to many farmers and graziers, some of whom are said to trust solely to their bank pass-book for a knowledge of their financial position.

Handbook of South Australia.

This very complete work has been issued at an opportune moment. The process of "filling up" in the United States and Canada has gone on so rapidly of late years that they no longer present the attractions to immigrants which they formerly did, and it is certain that in the next decade the attention of European agriculturists and labourers will be increasingly turned towards Australia, and that a large influx of valuable population will be the result. The "Handbook of South Australia" has been written by Mr. David J. Gordon, well known as the author of several works descriptive of our State, and has been issued by the Government, which will distribute 20,000 copies of it throughout the world. Its object is to serve as a guide to immigrants, tourists, and settlers, and it also constitutes a valuable official record of production and of historical statistical facts. The letterpress, which extends over 324 pages, is bright and instructive, and the illustrations are numerous and varied.

Ground Rock Phosphate.

Several farmers who have tried raw rock phosphate as a fertilizer during the past season have been greatly disappointed with the result. This matter was dealt with in our last issue, and a resolution of the Association of German Experiment Stations was quoted, advising agriculturists not to employ phosphates without acid treatment, except possibly in case of very acid lands. The Department of Agriculture has now issued the following notice:—

> Farmers and others are specially cautioned against purchasing ground rock phosphate which has not been treated with sulphuric acid. During the past season many farmers have suffered heavy losses through using this material. Experience shows that under South Australian conditions it is valueless for wheat and other cereals. Purchasers of fertilizers should write to the Inspector of Fertilizers for information in respect to this and other fertilizers.

Thrips on Wheat.

The Agricultural Gazette of New South Wales for January contains the following:—"The Government Entomologist recently visited Dubbo to investigate a case which has been brought under the notice of the Department of wheat infested with—what eventually proved to be—thrips. This is the first record Mr. Froggatt has had of thrips being found in wheat in Australia, although it is known to do serious damage to wheat in Europe. On visiting the paddocks, Mr. Froggatt found any green wheat therein to be swarming with a small, black thrips, apparently of a new and indigenous species. The farmers consider that it has caused a considerable amount of damage to the ripening wheat, and that the terminal grains on the tip of the ear are aborted by them. If this is the case, even a single grain of wheat out of every ear would mean a considerable loss in a field of wheat. It is, unfortunately, too late in the season to ascertain the actual damage, but the matter will be investigated very fully next season with a view to preventive measures being recommended."

Valencia Raisins or Lexias.

Though the pudding raisins so largely consumed in English-speaking countries are usually known as Valencias, very few are grown in the neighbourhood of the city of that name. The small seaport town of Denia, some forty miles to the south, in the extreme north of the province of Alicante, and within a few miles of the boundary between it and Valencia, is the real headquarters of the industry. It is in its neighbourhood that the great bulk of these raisins is grown, dried, and packed. Denia ships annually some 25,000 tons, as against Valencia's 1,000 to 1,500. The port of Gandia, about halfway between the two, and chiefly celebrated for its oranges, tomatoes, and onions, also contributes a couple of thousand tons. The term Lexia is perhaps more logical, indicating as it does the mode of manufacture. It is a corruption of the Spanish word Lejía (pronounced Le-hé-a), which means lye, referring to the alkaline solution into which the grapes are dipped before being dried, for the raisins of this part of Spain are almost exclusively Pasas de Lejía (lye raisins), as distinguished from Pasas de Sol (sun raisins), such as those of Malaga. Lexias are sometimes also termed Pasas Caldadas (boiled raisins), for the lye in which they are dipped is boiling hot. We have in the Denia raisin industry another striking example of that specialization to which I have several times had occasion to refer, and which is so noticeable in the viticultural regions of Europe. Denia is the home of the pudding raisin, just as Malaga is that of the dessert raisin. Though both appear to be made from the same "Moscatel" grape, identical with our Gordo Blanco, it seems as difficult to turn out a first-class pudding raisin at Malaga as it is to dry a high-grade dessert muscatel at Denia.—*F. D. Castella, Government Viticulturist of Victoria.*

Imports and Exports of Fruits and Plants.

During the month of January the Inspectors under the Vine, Fruit, and Vegetable Protection Act of 1885 admitted 5,876 bushels of fresh fruits (chiefly bananas), and destroyed 232 bushels of over-ripe bananas; 53 parcels of plants, 3,139 bags of potatoes, and 164 bags of onions were also admitted. One package of plants was rejected. The exports of vegetables to interstate markets amounted to 3,656 packages, and of fresh fruits 7,163 bushels, also 29 packages of plants. The oversea exports under the Commerce Act were 1,302 cases of fresh fruits, 33 packages of preserved fruits, and 113 cases of honey. These were consigned as follows:—For London, 97 cases honey; for New Zealand, 20 cases peaches and 53 cases grapes; for India and East, 1,219 cases apples, 10 cases pears, and 33 cases preserved fruits; for South Africa, 6 cases honey.

Storing Lemons.

In Californian lemon orchards the fruit is gathered when it reaches the size most desired by the market, irrespective of the degree of maturity of the individual fruits. If the lemons are desired for early sale, they are picked when about 2¼ in. in diameter—this being the size most desired. If the fruit is to be stored, it is allowed to get a little larger, to allow for shrinkage. Great care is exercised in handling the fruit to prevent injury to the skin. Each fruit is clipped off and not pulled, and when brought from the orchard it is immediately sorted into three grades—ripe, silver green, and green. The ripe fruit is for immediate disposal, but the other two grades are store. Should it be desired to have these placed on the market at an early date, they are coloured by being placed in an airtight room heated to 90 to 95 F. Over each burner a pail of water is placed to keep the air moist. Silver-green lemons will turn yellow in about four days under this treatment, while green fruit will take six days. Great care requires to be exercised in this process, as if the fruit is left in too long it will decay rapidly after removal. Fruit that is to be kept for several months is packed in boxes or trays, which are stored in cool, well-ventilated cellars or special storehouses. These latter are rather open and well ventilated—in some cases the sides are movable—and the lemons are protected against extremes of temperature by tent-like coverings. The object aimed at is a relatively even temperature—not too dry, which would result in shrivelling of the fruit; nor too moist, which would cause mould and decay. The boxes, being put up in convenient-sized stacks, can be examined without much trouble, and each stack is covered with a separate tent. In cellars the tent system is sometimes used, but more often other methods of regulating the temperature are resorted to.

Flies as Feed for Fowls.

America is leading the way in a new article of export—flies. In the great Central Market of Chicago the flies are innumerable, and the practical Americans catch them in traps, and then pack them in casks. In England they are sold to poultry-breeders. There is, perhaps, no place in the world where the small, black fly, of the eye-biting and lip-bunging variety, is so numerous as in our country beyond the rainfall line, but whether these pests could be trapped and utilized profitably as fowl-food is another matter.

The American Apple Crop.

The American Agriculturist of October 31 states that the 1908 apple crop is smaller even than the previous year, which was a short one. The total crop for 1908 is put at less than 69,000,000 bushels, against 86,070,000 bushels last year, 114,840,000 bushels in 1906, 72,900 bushels in 1905, and 136,080,000 bushels in 1904. The export to Europe is expected to be much less than last year, as not only is there a shortage of 17,000,000 bushels, but the recovery from the financial panic of 1907-8 will result in the local consumption reaching the normal again.

Saltpetre from Peat.

Professor M. Müntz, a teacher of the Agricultural High School of Paris, urges that ordinary peat may be used as a source of saltpetre when the South American deposits of nitrate become exhausted. According to Professor Müntz, the rapid process of decomposition of certain organic substances, whose final outcome is the formation of saltpetre, is the work of innumerable microscopical organisms, and consists of three distinct phases. The first is the formation of ammonia, the second the oxidation of that substance through the atmospheric oxygen and its transformation into nitrogenous salts, and the third the liberation of nitric acid from these salts. The formation of saltpetre is completed as soon as the nitric acid has combined with the potassium contents of the soil and the calcium and magnesium salts contained therein. Experiments were made with a cylindrical wire-basket containing a mixture of peat and lime or soda. Then follows the introduction of the microbes on a suitable medium—a bit of wadding the size of a finger may contain 150,000,000. The cultures may be kept and propagated in the manner practised by bacteriologists. Once in the peat the microbes multiply at an enormous rate, which may be accelerated by warming the mixture to 30 deg. C. (about 90 deg. F.), and moistening it with a solution of sulphate of ammonia. If this is done, the contents of the basket will soon be at rest again, and the multitudes of tiny workers will have run their short career. The basket will then contain 50 per cent. of pure saltpetre. The process may be carried out on a large scale, in which the moistening with sulphate of ammonia and the warming form the principal items. One acre of peat may, according to the Professor, be made to yield 20,000 tons of saltpetre in one year. Sulphate of ammonia may be obtained as a by-product.—Abridged from *Das Echo*.

A Long-lived Merino.

The Agricultural Journal of the Cape of Good Hope for December contains the following statement:—"Mr. H. F. Evens, sheep inspector, Mount Currie, forwards a photo of a Merino ewe, a pet animal belonging to Mr. T. T. Joyner, of Glen Edward, Mount Currie. This animal died in October last at the age of eighteen years. This is claimed as a world's record. We have no data on the subject, but possibly some of our readers may be in a position to offer some information."

Protecting Trees from Rabbits.

The American Agricultural Department reports, as the result of a considerable amount of experimental work, that the most effective and lasting wash for protecting the stems of fruit-trees and shrubs against injury by rabbits is the lime-and-sulphur wash. This is cheap, easily made and applied, and it is claimed that it remains an effective preventive of injury for the whole year. The lime-and-sulphur wash is also one of the best winter remedies for San Jose and mussel scales. It is made by boiling 4 ℔. unslaked lime and 3 ℔. of flowers of sulphur in 4 gallons of water for an hour or more; for use the solution is made up with water to 10 gallons. A little salt is often added to increase the adhesive property of the mixture, which can be applied with spray-pump or brush.

A Fine Old Red-gum.

Enquiry Department.

WITHERING OF VINE-LEAVES.

"J. F. D.," Prospect, asks why the vines covering a trellis 56 x 9 ft. have for the past few years had the leaves turn yellow and drop off from the beginning of December, and have now an autumn-like appearance.

Mr. Geo. Quinn, Horticultural Expert, replies:—"Without a personal inspection of the surroundings it is difficult to give a definite reason for this premature decline of the foliage. If the vines are completely covering the trellis, and the faded leaves are on the lower side, it may be attributed to the effects of too much shade. Certain varieties, such as the Black Prince and Zante currant, are particularly liable to act in this manner when the trellis is completely enveloped by the plants; but in these instances the development of the bunches of fruit is not seriously affected. Extreme dryness of the soil, which may be caused by the presence of much vegetation immediately adjoining the vines, more particularly when it is composed of strong-growing fruit-trees, or lack of tillage, may be the cause. The presence of soluble salts in the subsoil also produces similar effects on grape-vines, but I would scarcely suspect this to be the cause in your neighbourhood. I am disposed to think that the absence of moisture is to be blamed for it, assuming that the growth is not dense enough to shut the light out from much of the foliage. I have not had other complaints of this nature from your neighbourhood."

FRUIT-TREES ON LIMESTONE SOIL.

"R. G." asks advice as to planting limestone soil near Hampstead with almonds, other fruit-trees, and vines.

Mr. Quinn replies:—"I would suggest that you use almonds as a shelter belt. Planted in double, or even four, rows deep, they might be set as near as 18 to 20 ft. apart; but if you are determined to plant them in blocks, do not place the nearer together than 24 ft. on the square system. The best almonds now on the market are Brandis, Peerless, Hatch's Nonpareil, and White Nonpareil. As to apricots, I think early-ripening kinds, such as Newcastle Early and Oullin's Early, should ripen at a good period in your neighbourhood. As regards your Brandis almonds which are now four years old and have not fruited, you need not be alarmed, as the fruit-bearing habit will develop with age I would not advise that either ringing or pruning be applied. I do not think that limestone will hasten the death of the trees to any very serious extent, but where it reaches within a foot of the surface the crust should be broken away wherever trees are to be set."

Diarrhœa in Fowls.

A farmer writes that disease is affecting some of his birds, the general symptoms being:—The food is not digested, the crop remains full, the comb is dark, diarrhœa is present, and the birds lose the use of their legs and soon die.

Mr. D. F. Laurie, Government Poultry Expert, replies:—"The cause is a micro-organism, whose life history has not been worked out as far as I know. The drinking-water is frequently a distributing agent for disease germs. All drinking-vessels should be kept scrupulously clean, and should be rinsed out with a strong solution of permanganate of potash (often called Condy's crystals). Mix a supply with boiled water, and keep in a well-corked bottle. Add to the drinking-water just sufficient of this solution to impart a faint tinge. Sick birds are generally past hope, but some cases yield to treatment. I have found ten drops of sanitas in a teaspoonful of water twice a day a good cure for early treatment if the affected bird will eat or drink. Epsom salts may be added to the drinking-water or dissolved and mixed with the soft food, say, for one fowl as much as will lie on a threepenny piece. The fowls are much benefited at this time of year by mixing for each twenty adult birds a packet of Epsom salts with enough warm water to mix their soft food. Give once a week. Severe cases, where diarrhœa is present and the crop full, are practically hopeless, unless the content of the crop be evacuated by operation, and then relief may be given in the shape of four to six drops of chlorodyne in a tablespoonful of water."

The Hatching-season.

"J. S.," Port Adelaide.—It is not the season for hatching eggs, if you wish to rear good stock. Separate the sexes until after the moult. Early in April you can mate up all forward birds and hatch with good results. You will find a ready market in spring for all your table poultry.

Export of Poultry.

"Poultry for Export."—Yes; poultry (chickens and ducklings) may be sent now to the Produce Depot, Port Adelaide, for export to London.

The Crowing Hen.

"Crowing Hen."—Mr Laurie replies:—"An old superstition without foundation. I have owned many crowing hens which laid very well. It is an abnormal habit, and it may be as well not to breed from such hens unless you carefully watch progress later on."

Lockjaw in Horses.

By Veterinary-Surgeon Desmond.

Until the last few months all the cases of Tetanus (lockjaw) in animals in this State were reported from the South-East. Recently numerous cases of this disease have been reported from the Lower North, and on being investigated they were found to be due to the following causes:—1. Unskilful treatment of wounds. 2. Castration of colts and lambs with dirty hands and instruments; also, by placing the animals operated on in bad surroundings, *i.e.*, dirty yards. The germs of Tetanus are very common in Nature, and can be found in old cultivated soils, manure heaps, and old yards.

This micro-organism (germ) will not grow or develop any poisonous substance in an open wound, as it cannot flourish in the presence of air. Punctured wounds, in which dirt carrying the germ of Tetanus has entered the tissues, are the frequent cause of the disease. Where an open wound has been unskilfully treated, or the animal has been operated on in a dirty yard, or dirty hands and instruments used in operations—these are the common causes for infecting what might be a simple wound under ordinary conditions. The germs do not multiply and produce their poison until the wound has healed, that is, until the presence of air has been excluded. Wounds of the mouth, the jaws, and digestive tract are not the common parts for the entry of this germ. The horse is the animal most prone to this disease, which causes a death rate of over 90 per cent.

Prevention.—In all operations, no matter how simple, wash the part to be operated on with hot water and washing-soda, clean the hands and finger-nails with the same solution, and boil the instruments. The animals to be operated on should be secured on a clean grass plot, and not in dirty yards covered with manure or loose dust. Open wounds should be kept clean with hot water and washing-soda. Do not use any oily preparations, or embrocations that dry up the part and leave a lasting blemish.

Treatment of Affected Animals.—Place the animal in a dark loosebox, well bedded with straw. All light must be kept out. The loosebox should be in a very quiet place. Disturb the patient as little as possible. Keep a supply of cold water in the manger. If the horse can suck up fluids, give gruel, hay tea, and water in which oats or wheat has been boiled. Giving medicines, except by a duly qualified veterinary-surgeon, only hastens the death of the affected animal.

Agricultural Experiments for 1908-9.

By Wm. Angus, B.Sc.

This season the results of the experiments with cereals carried out by the Department at various centres throughout the State have just reached us in time to be printed in this month's issue in order that they may be of some use to farmers in making their arrangements for the seeding-season which is fast approaching. No detailed report can at present be submitted with these results, but such a report will follow later.

COMPLETE V. INCOMPLETE MANURES FOR WHEAT.

These experiments were instituted chiefly with the object of demonstrating what manures are the most profitable for the farmer to use over a series of years. Tests of the following manures and combinations have been made:—Phosphates in two forms—the mineral and organic—in mineral super and bone super; mineral super on land to which lime has been applied a few weeks beforehand; mineral super, combined with sulphate of potash; mineral super, combined with nitrate of soda; nitrate of soda, in combination with sulphate of potash; and a complete manure, *i.e.*, a manure supplying the principal plant-foods, *viz.*, nitrates, phosphates, and potash. These tests are compared with a no-manure plot, with which the natural ability of the land to produce wheat crops without manure is tested.

In Table I. the yield per acre for each season is shown, the average for a series of years, and the cost of manure per acre. The results are most satisfactory in almost every case, and they demonstrate the need for phosphates in our agricultural lands. No explanation of this table is needed. The treatment is clearly stated at the top of each column, and the name of the centre and of the farmer is shown in the first column on the left-hand side. The most interesting feature of the table is the average increase per acre of each manured plot over the unmanured plot.

The whole gist of these experiments is contained in the two bottom columns, giving the cost of manure per acre and the average increase per acre over the unmanured crops at all stations. The results are too obvious to require comment.

WHEAT VARIETY TESTS.

In Table II. will be found the results from the centres where wheat varieties have been grown for four years. These results become more useful and more reliable the longer the experiments are continued, and the averages for the four years of the different varieties are bringing out the fact that several of our newer wheats have come to stay. Yandilla King and Federation have done particularly well in this trial, and although Silver King gives the high average of 22¾ bushels per acre, it must be noted that it has not been grown at Rhine Villa, which tends to give it an advantage over the other wheats which have been grown there. This should be taken into account when comparing the results.

TABLE I.

COMPLETE v. INCOMPLETE MANURES FOR WHEAT.

Table showing yield per Acre for each Season. Averages over series of years, and cost of Manure per Acre.

Centre.	Year.	Plot 1. 1 cwt. Min. Super.	Plot 2. 1 cwt Min. Super. 5 cwt. Lime.	Plot 3. 1 cwt. Min. Super. ½ cwt. Sul. Potash. ½ cwt. Nit. Soda.	Plot 4 1 cwt. Bone Super.	Plot 5. No Manure.	Plot 6. 1 cwt. Min. Super. ½ cwt. Sul. Potash.	Plot 7. ½ cwt. Sul. Potash. ½ cwt. Nit. Soda.	Plot 8. 1 cwt. Min. Super. ½ cwt. Nit. Soda.
F. Coleman, Saddleworth ...	1905	31 bush.	29¾ bush.	33¾ bush.	34½ bush.	29¾ bush.	35 bush.	30¾ bush.	33¼ bush.
	1906	32¼ ,,	34¼ ,,	32¼ ,,	34 ,,	23¾ ,,	33½ ,,	24¾ ,,	36¼ ,,
	1907	35¾ ,,	38½ ,,	39¼ ,,	36¼ ,,	24¾ ,,	35½ ,,	25¼ ,,	35¾ ,,
	1908	17½ ,,	19½ ,,	21 ,,	17½ ,,	7½ ,,	19½ ,,	9 ,,	19 ,,
Average for 4 years		29⅛ ,,	30½ ,,	31½ ,,	30½ ,,	21½ ,,	30¾ ,,	22½ ,,	31 ,,
P. A Cockburn, Strathalbyn	1905	14½ ,,	17¼ ,,	16 ,,	16 ,,	16 ,,	17½ ,,	15¼ ,,	14¾ ,,
	1906	6¼ ,,	5¾ ,,	5 ,,	6 ,,	5 ,,	6½ ,,	6½ ,,	6¾ ,,
	1907	14¾ ,,	13¼ ,,	14¼ ,,	14 ,,	11¼ ,,	14½ ,,	12½ ,,	13¼ ,,
Average for 3 years... ...		11¾ ,,	12¼ ,,	11¾ ,,	12 ,,	10¾ ,,	12¾ ,,	11½ ,,	11½ ,,
J. E. Taylor, Peachy Belt, Virginia	1905	19½ ,,	18¾ ,,	17¾ ,,	16¼ ,,	12 ,,	15¼ ,,	10 ,,	18 ,,
	1906	14¾ ,,	14½ ,,	15½ ,,	14 ,,	10 ,,	14¼ ,,	14¼ ,,	20¾ ,,
	1907	15¼ ,,	11½ ,,	9½ ,,	9½ ,,	6½ ,,	8¼ ,,	9¾ ,,	13½ ,,
	1908	25½ ,,	25½ ,,	27 ,,	25½ ,,	22¾ ,,	22¼ ,,	27¼ ,,	29¾ ,,
Average for 4 years ...		18¾ ,,	17½ ,,	17½ ,,	16¼ ,,	12¾ ,,	15 ,,	15¼ ,,	20½ ,,
J. Schuppan, Wilmington...	1905	20 ,,	20¾ ,,	21 ,,	21¾ ,,	15¼ ,,	24¾ ,,	17½ ,,	22 ,,
	1906	35¼ ,,	33½ ,,	32 ,,	31½ ,,	23½ ,,	27¼ ,,	22¼ ,,	30 ,,
	1907	18¼ ,,	21¼ ,,	19¼ ,,	19¼ ,,	12¼ ,,	20¼ ,,	15¼ ,,	17¼ ,,
	1908	24¾ ,	32 ,,	35¾ ,,	34½ ,,	24¾ ,,	32¼ ,,	23½ ,,	30 ,,
Average for 4 years ...		24½ ,,	26⅞ ,,	27 ,,	27¾ ,,	18⅞ ,,	26⅛ ,,	19⅝ ,,	24¾ ,,
T. Freebairn, Georgetown...	1906	21½ ,,	20½ ,,	20½ ,,	21¼ ,,	19½ ,,	24 ,,	21 ,,	19 ,,
	1907	24¼ ,,	22¾ ,,	25¼ ,,	24¼ ,,	14¾ ,,	26¾ ,,	16¾ ,,	31¼ ,,
Average for 2 years... ...		22¾ ,,	21¾ ,,	22¾ ,,	22¾ ,,	17⅛ ,,	25⅜ ,,	18⅞ ,,	25⅛ ,,
J. Hill, Coonalpyn	1908	19 ,,	14¾ ,,	14¾ ,,	15¾ ,,	6½ ,,	12¾ ,,	6¼ ,,	14¼ ,,
Cost of Manure per Acre ...		4s. 0d.	9s. 10d.	18s. 0d.	5s. 6d.	—	11s. 0d.	14s. 0d.	11s. 0d.
Average increase per acre over unmanured crop at all stations		6 bush.	6 bush.	6¼ bush.	6¼ bush.	— bush.	6 bush.	1 bush.	6·6 bush.

TABLE II.

WHEAT VARIETY TESTS.

Table showing yield per Acre of different Varieties of Wheat, grown at various centres for four years.

Variety.	Year.	J. W. Vigar, Rhine Villa (now W. T. Vigar).	R. Barr, Jun., Bews.	E. J. Barraud, Lipson.	F. Lehmann, Caltowie.	Average Yield for each Year.	Year.	Average Yield for 4 Years.
		bush.	bush.	bush.	bush.	bush.		bush.
Marshall's No. 3 … …	1905	11	11¾	28	30¼	20¼	1905	19·19
	1906	5½	21¾	19¼	27	18¼	1906	
	1907	17¾	13½	23¼	28	21	1907	
	1908	21	6¼	24½	17¾	17¼	1908	
Yandilla King … …	1905	11	13¼	38¾	35¼	24½	1905	22·56
	1906	9¼	23	24¼	29¼	21½	1906	
	1907	21½	8½	29¾	33¼	23¼	1907	
	1908	22¾	7½	36¼	17¾	21	1908	
Federation … …	1905	6½	10½	35¼	—	17½	1905	21·00
	1906	12¼	19¼	24¾	33¼	22½	1906	
	1907	17¾	14¾	22¾	29½	21¼	1907	
	1908	30	6½	35	19	22¾	1908	
Carmichael's Eclipse …	1905	7	10½	24½	15½	14¼	1905	17·44
	1906	11½	21¾	17¼	23	18¼	1906	
	1907	18½	14¾	25	23	20¼	1907	
	1908	21½	6½	22½	—	17	1908	
Comeback … …	1905	7	9¾	22	21	15	1905	18·56
	1906	13	23	19	22½	19¼	1906	
	1907	15¼	14½	19¼	22¼	17¾	1907	
	1908	21½	4	19	12¼	14¼	1908	

Gluyas	1905	12½	16¼	—	20	16¼	1905	15·63
	1906	13½	19¼	13¾	—	15½	1906	
	1907	11¾	14½	20½	—	15½	1907	
	1908	—	7	23½	—	15¼	1908	
Petatz Surprise ...	1905	6¼	10¼	18½	18½	13½	1905	16·06
	1906	13½	21¾	17¾	23	19	1906	
	1907	15½	10½	21¼	—	15¾	1907	
	1908	—	4½	27½	—	16	1908	
Gallant	1905	7	11	22	30¼	15	1905	16·25
	1906	7¼	20¼	20¼	25½	15¾	1906	
	1907	15¾	12¾	25¾	26½	20¼	1907	
	1908	—	7	21¼	—	14	1908	
Dart's Imperial... ...	1905	14¼	16¼	—	31	20½	1905	18·75
	1906	8	22	—	29	19½	1906	
	1907	18½	12¼	—	26	19	1907	
	1908	25¼	7½	—	15¾	16	1908	
Nhill	1905	12½	14½	—	24	17	1905	15·38
	1906	12	25¼	—	25	20½	1906	
	1907	18¼	12¼	—	24	18	1907	
	1908	—	6	—	—	6	1908	
urple Straw	1905	8½	—	—	—	8½	1905	18·44
	1906	8	—	—	26¾	17½	1906	
	1907	19½	—	25¾	26¼	23¾	1907	
	1908	—	—	31¾	16	24	1908	
King's Early	1905	9½	—	—	19	14¼	1905	19·56
	1906	12	—	—	25	18½	1906	
	1907	19¾	—	—	—	19¾	1907	
	1908	25¾	—	—	—	25¾	1908	
Silver King	1905	—	13	31	33¾	26	1905	22·75
	1906	—	22	23¾	26½	24	1906	
	1907	—	12½	28¾	26½	22½	1907	
	1908	—	6¼	28	21½	18½	1908	
Phillis Marvel	1905	—	10¼	—	30	20¼	1905	19·19
	1906	—	22½	—	25¾	24	1906	
	1907	—	14¾	—	28½	21½	1907	
	1908	—	6½	—	15½	11	1908	

Seed and manure were supplied to a number of farmers, principally in the recently-opened districts, for experimental purposes. The following have carried on wheat variety tests for less than four years:—

T. Freeman, Bagster, West Coast.

		1907.				1908.				
Comeback	yielded	8	bush.	0	℔.	12	bush.	0	℔.	to the acre.
Yandilla King	,,	4	,,	30	,,	9	,,	0	,,	,,
Carmichael's Eclipse	,,	7	,,	30	,,	7	,,	30	,,	,,
King's Early	,,	11	,,	0	,,	12	,,	30	,,	,,
Dart's Imperial	,,	4	,,	0	,,	8	,,	0	,,	,,
Gluyas	,,	16	,,	0	,,	10	,,	15	,,	,,
Marshall's No. 3	,,	5	,,	0	,,	8	,,	0	,,	,,
Nhill	,,	13	,,	0	,,	12	,,	0	,,	,,
Smart's Early	,,	8	,,	0	,,	10	,,	0	,,	,,
Red Straw	,,	6	,,	0	,,	8	,,	0	,,	,,
Allora Spring	,,	8	,,	0	,,	8	,,	30	,,	,,
Boomerang	,,	11	,,	30	,,	10	,,	0	,,	,,

A. E. Lovegrove, Streaky Bay.

		1907.				1908.				
Yandilla King	yielded	2	bush.	55	℔.	11	bush.	55	℔.	to the acre.
Federation	,,	4	,,	40	,,	20	,,	7	,,	,,
Comeback	,,	1	,,	53	,,	11	,,	30	,,	,,
Carmichael's Eclipse	,,	4	,,	21	,,	12	,,	40	,,	,,
Dart's Imperial	,,	1	,,	57	,,	11	,,	45	,,	,,
Gallant	,,	1	,,	54	,,	9	,,	50	,,	,,
Neumann's Early	,,	2	,,	33	,,	9	,,	17	,,	,,

J. H. Newell, Koppio.

		1907.				1908.				
Comeback	yielded	13	bush.	49	℔.	9	bush.	32	℔.	to the acre.
Purple Straw	,,	19	,,	4	,,	12	,,	15	,,	,,
Yandilla King	,,	21	,,	21	,,	11	,,	8	,,	,,
Majestic	,,	19	,,	42	,,	9	,,	26	,,	,,
Federation	,,	24	,,	19	,,	11	,,	57	,,	,,
Dart's Imperial	,,	18	,,	3	,,	12	,,	1	,,	,,
King's Early	,,	—	,,	—	,,	7	,,	24	,,	,,
Neumann's Early	,,	—	,,	—	,,	6	,,	21	,,	,,
Gluyas	,,	—	,,	—	,,	8	,,	7	,,	,,
Gallant	,,	—	,,	—	,,	8	,,	46	,,	,,

G. E. Venning, Coonalpyn.

1908.

Gluyas	yielded	8	bush.	3	℔.	to the acre.
Neumann's Early	,,	7	,,	55	,,	,,
King's Early	,,	8	,,	27	,,	,,
Carmichael's Eclipse	,,	6	,,	48	,,	,,
Comeback	,,	6	,,	28	,,	,,
Federation	,,	7	,,	28	,,	,,
Yandilla King	,,	9	,,	53	,,	,,
Dart's Imperial	,,	8	,,	43	,,	,,

T. Griffin, Hammond.

1908.

Turkey Red	yielded	1	bush.	40	℔.	to the acre.
Federation	,,	8	,,	46	,,	,,
Comeback	,,	7	,,	59	,,	,,
Yandilla King	,,	7	,,	44	,,	,,
John Brown	,,	7	,,	27	,,	,,
Gluyas	,,	7	,,	10	,,	,,
Viking	,,	7	,,	58	,,	,,

R. S. McDonald, Monarto.

1908.

Marshall's No. 3	yielded	15	bush.	45	℔.	to the acre.
Carmichael's Eclipse	,,	13	,,	7	,,	,,
Nhill	,,	16	,,	0	,,	,,
Dart's Imperial	,,	22	,,	42	,,	,,
King's Early	,,	13	,,	49	,,	,,
Federation	,,	27	,,	0	,,	,,
Yandilla King	,,	16	,,	44	,,	,,
Comeback	,,	11	,,	0	,,	,,

OAT VARIETY TESTS.

H. Bone, Coonalpyn.

Sown in May, 1908, with 1 cwt. mineral super per acre.

Garton	yielded	7	bush.	38	℔.	to the acre.
Algerian	,,	8	,,	22	,,	,,
Champion	,,	8	,,	26	,,	,,
Waverley	,,	10	,,	26	,,	,,
Calcutta	,,	13	,,	4	,,	,,
Cape	,,	16	,,	31	,,	,,
Scotch Greys	,,	18	,,	50	,,	,,

W. R. Richardson, Koppio.

Sown in June, 1908, with 1 cwt. mineral super per acre.

Garton	yielded	6	bush.	20	lb.	to the acre.
Goldfinder	,,	7	,,	10	,,	,,
Waverley	,,	12	,,	20	,,	,,
Dunn	,,	11	,,	20	,,	,,
Abundance	,,	13	,,	0	,,	,,
Cape	,,	18	,,	0	,,	,,

TABLE III.

PHOSPHATE TESTS WITH WHEAT.

W. R. Richardson, Koppio.

Plot 1.	Manure per Acre.	Yield per Acre.							
		1905.		1906.		1907.		1908.	
		bush.	lbs.	bush.	lbs.	bush.	lbs.	bush.	lbs.
1	148 lbs. Mineral Super	26	52	18	40	29	12	23	30
2	168 lbs. Thomas Phosphate ...	22	18	17	38	18	54	17	14
3	100 lbs. Ground Phosphate Rock	11	36	11	14	8	30	8	26
4	84 lbs. Guano	11	6	13	2	7	34	9	20
5	No Manure	7	53	9	4	3	40	—	
6	74 lbs. Mineral Super and 84 lbs. Thomas Phosphate ...	22	46	14	10	14	38	9	30
7	74 lbs. Mineral Super and 50 lbs. Ground Rock Phosphate	20	36	15	14	14	2	10	30
8	84 lbs. Thomas Phosphate and 50 lbs. Ground Rock Phosphate	21	12	14	40	11	48	9	30

HAY TESTS.

These were carried on at Mount Barker and Aldinga. The plots at Mount Barker received a dressing of 1½ cwt. of Thomas phosphate and those at Aldinga 1½ cwt. of bone manure. Messrs. Pope Bros., who had charge of the plots at Mount Barker, report that the season was not a favourable one for that district, the winter being cold and wet, followed by a dry spell from the middle of October. The plots also showed signs of rust, Phillis Marvel being the worst in this respect. At Aldinga half of the two-acre plots were allowed to stand for grain in order to ascertain which variety would prove the best all-round wheat for that district.

TABLE IV.

HAY TESTS.

Variety.	Pope Bros., Mount Barker.			T. Pengilly, Aldinga.				
	tons.	cwt.	lbs.	tons.	cwt.	lbs.	bush.	lbs.
Phillis Marvel	1	17	0	2	8	38	20	25
Gallant	1	17	15	2	17	26	24	19
Baroota Wonder	1	14	95	2	11	99	21	14
White Tuscan	2	0	83	3	12	102	28	45
Triumph	1	13	95	2	5	11	19	1
Majestic	1	11	96	3	10	2	27	21
Silver King	1	18	47	2	9	57	24	8
Yandilla King	—	—	—	2	8	67	24	42

DRY-FARMING EXPERIMENTS.

The results of the dry-farming experiment at Hammond will be read with considerable interest, as they are the first from the plots that have been worked on dry-farming principles. If the results continue as satisfactory from the adoption of this system as they have been in this particular case, then there is a great future for the farmer in the areas where the annual rainfall averages from 10 to 14 in. The success of this year's work will give an added interest to the extension of this scheme to Oladdie, Dawson, and Loxton.

TABLE V.

DRY-FARMING EXPERIMENTS.

Variety of Wheat—Federation.

Plot.	Treatment.	Yield Per Acre.	
		bush.	lbs.
1	Double disked, ploughed 6 in. deep and subpacked immediately	23	4
2	,, ,, 6 in deep, but not subpacked	20	27
3	,, ,, 6 in deep, and subpacked before sowing	20	54
4	,, ,, 4 in. deep, and subpacked immediately	17	42
5	,, ,, 4 in. deep, but not subpacked	14	21
6	,, ,, 4 in deep, and subpacked before sowing	12	22
7	Lay land, ploughed in autumn before seeding and subpacked ...	14	4
8	,, ,, ,, ,, but not subpacked	12	44

In addition to the above, Plots 1 to 6 were cultivated or harrowed after every rain sufficient to cause the surface to run together and set hard.

The Art of Irrigation.

The First Mistake.

By T. S. Van Dyke, in *The Irrigation Age*, Chicago.

[In forwarding this article, Mr. S. McIntosh, manager of the Experimental Farm, Murray Bridge, writes:—"We constantly meet instances where the inexperienced man is in a hopeless muddle with his first attempts at watering, and I am justified in asserting that many hundreds of acres of originally good soil have been temporarily ruined through being improperly graded and irrigated. Recently I inspected, by request, a field planted with lucerne seed, where the owner, after laying out the ground to his own satisfaction, started off at noon with the intention of thoroughly watering at least four acres ere the shades of evening fell, whereas at 6 p.m. I found water in all directions but where it was actually required, and not more than a quarter-acre flooded (in fact, it held the bulk of the water intended for the full area). This most unsatisfactory condition of affairs was brought about firstly through the land being ungraded before it was sown; secondly, through the want of proper and adequate channels and banks to control and regulate the water intended for irrigation; and, thirdly, through the total want of practical experience on the part of the operator. I am pleased to state that the would-be irrigator at once handed over his property to a practical contractor, with instructions to the latter to construct the necessary channels, etc., with the least possible delay."]

About all you know at first about irrigation is that it will cost too much to imitate rain. From which you quickly drift to the conclusion that the next best plan is to cover the ground with a sheet of water. You have a piece that looks very level, and turn on a stream. But instead of spreading out it slides off to one side, or collects in little pools with sloughs between. Or it may dish in the centre cut, or from a ridge, and slide off both sides. In any case, it is likely to leave many dry spots, and their combined area will probably be too great to be ignored. Three solutions soon suggest themselves.

First, to keep the water on long enough to allow the dry places to get wet by water soaking to the sides from wet spots. If the dry spots are small, and you are merely testing the fertility of the soil or in haste to get a few radishes or something of little value, this may be the least objectionable of the three, for it may not have the water too deep or muddy, unless you purposely make it so.

Number two, a special favourite with most tyros, consists in shovelling off the bumps while the water is running and throwing the loose dirt into the water in the low places. When the water goes down you find your uneven shovelling has tripled the number of bumps, and though none are as high as before, they are still high enough, in spite of the fact that you have raised the low places. And in the low places you have doubled or tripled the thickness of the paste that will bake under the hot sun, and which, without your filling, would have been thick enough to stop many kinds of seed and sicken most of the plants that were strong enough to push through it.

Number three is a very choice method, devised by those who discover the bad features of the other two. It is simply throwing up a levee around the piece high enough to raise water over all the high spots. You find it would not pay to shovel them off on a tract of any size, even if you could do it, and also that increasing the quantity of water merely makes it cut more in the low places. The obvious thing is to back it up so as to cover. This is the origin of the "check" system, one of the leading systems of the world, and one quite indispensable for many kinds of work. They are called "basins" by some, "borders" from the levees by others, "plots," "pans," etc., but "check" is the most common in all sections. "Basin" really belongs to a modified form, in which only a part of the ground is wet instead of the whole.

Your selection of method number three may be very bad, as many plants cannot endure it, no matter how well done. But assuming your choice all right, you are quite certain to have grief in its details. The temptation to make the levee out of wet mud instead of waiting for the soil to dry after your first failure is quite irresistible when you are in haste to see something green or get a bite of fresh vegetables. On many soils such levees melt like mush when the water gets a few inches deep, and nearly all your attempts to repair them result only in more mush, more muddy water to form a paste inside, and final breaking, in spite of you, when the water is high enough.

If you wait and make them of dry soil you are quite apt to make them too thin, too loose with weeds, sticks, and grass that may lead a small thread of water through, and so low that if the check is of any size the waves from the first wind will breach it. If your ground is so flat that a low, flimsy levee will suffice to hold water long, it will probably mean that your ground generally is too flat for easy drainage, and that the building of proper drainage ditches should precede any irrigation. For on many soils and for many plants a quick clearance of the water after being on long enough is essential. But you will naturally leave this discovery until after wasting a lot of time wondering why your stuff doesn't grow better.

Assuming that your levees hold, and you have the highest points covered and some crop started, you may be surprised to find plants doing best on the highest parts. On the lowest parts they may not even have sprouted, being locked up tight under a blanket of paste. And even on the highest places they may look bad. It does not take you long to discover that the deeper the water the worse the results. This is due to some extent on most soils by the greater pressure tightening the soil, and also to handling the water in such a way that it is muddy instead of clear, when the deepest parts get the most mud. Later on you may find that you have been wasting one-half or two-thirds of the water, because if the highest parts got enough to make a good growth of vegetation it is quite probable that the lowest parts had too much. From which you finally conclude that the whole should be graded down to a more uniform surface. A very sage conclusion, but you have little conception of the distance you are from the profitable part of its realization. You are quite apt to think that you have a fine eye to tell a level. But let me tell you that the longer a surveyor uses a fine level the more certain he will be to rely on the telescope and rod instead of the eye. There is but one thing of which you may feel sure, and that is that when you are looking toward high mountains a level on the plains below will look downhill, and a ditch running out from a canon will seem to run uphill.

Relying on your eye, you are quite sure to overlook such little trifles as a swell of two or three inches, if it is broad enough. Or if you notice it, you are quite likely to say it will amount to nothing, and that the water will go over it anyhow. Still more certain you are to do this if the swell happens to be at the upper side, where the water is delivered, so that it will have to go over it to get into the check at all. This latter conclusion is all the worse, because so long as the ground is bare it may be correct, or nearly so. But when covered with a heavy stand of vegetation like grain or alfalfa it may collect all floating leaves or rubbish on its upper edge and throw the water off on the sides, leaving a spot too dry when the rest of the field has enough. And in time this may become worse instead of better, the water swinging farther away and wasting in the lower places that would have enough without it. And this you may not notice until the growth becomes too valuable to change. This may happen when you are well aware of the necessity of perfect grading, for one is often inveigled into the snare through haste or anxiety to see something green. I have thirty acres of alfalfa scratched in hastily to get green pasture for the horses six years ago, although I knew better twenty years before that. It is the bane of my existence now, taking fully twice the water and work required by other tracts properly graded, yet paying too heavily to plough up. California is full of orchards in the same situation, for it is about equally bad under all methods of applying water. You may be fortunate if right here you make the worst sort of a failure. For in no other way can most people be made to understand the supreme importance of proper grading. Those who have been through the torment may talk and talk in vain. You will insist that the ground looks all right and is all right when nothing but the level or levelling by water itself can tell you whether it is or not.

Proper grading is no serious matter if you only realize its importance at the outset and determine to allow nothing else. You do not have to make any large area flat or anywhere near it. But in whatever way you handle the water it should travel at a uniform velocity whether the head of the water be large or small, or whether it is to run a long time or a short time. And this does not have to be on one face or plane so as to shave off too much top soil. Even a small place may be laid out on several planes so that it can be evenly flooded, and, though in a certain sense this is like terracing, it may be quite free from the expense of terracing, such as one commonly sees on hillside gardens.

In a book of this size it is impossible to go far into the subject of grading, because it will vary so much with the area to be graded, the quality of the soil, the kind of vegetation on it, and so many considerations. On the Mojave Desert in California I sweep brush, hillocks, and everything with two large railroad bars slightly curved so as to keep the cutting edges down. One is set behind the other with strong chains, and five or six horses are put on each end. With that power and two drivers I don't have to plough at all. Nor do I have to plough in making the checks. I first set four level stakes with the telescope and move the earth above that level with a carrying scraper and four horses abreast direct to the levees. The soil is so dry and loose that this is very easily done. The work is finally tested with water, and then polished off with a grading machine when dry. Ploughing, when unnecessary, is a nuisance, because it increases so much the bulk of the soil that it is harder to work to the grade stakes.

But this would not do for many soils, while for small areas it might not pay to have such an outfit. A drag with a cutting and carrying edge is often better than the railroad iron if brush is not too heavy. But it should be so long and stiff that it will not climb bumps and sink into depressions, but shave the bumps and drop the shavings into the depressions. This should often be 40 ft. long and loaded with sandbags, so as to take a dozen horses or more. No kind of a gouging scraper such as the common "slip scraper" will do good work, though on a small scale fair work may be done with the "buck scraper" by an expert. It may pay you at the start to have a good road grader, while for small garden work you had better grade with shovel and hoe than not at all. When you thoroughly realize its importance you will find a way to do it according to the size and quality of your soil, the value of your crop, and the balance in bank. And beware how you try to economize on it, for every dollar you save may cost you two or three without your knowing it.

You can now buy a fair level for twenty dollars, though you had better pay twice that. Its use is no such great trick as is commonly imagined. Any boy or girl of fifteen can soon learn to use it well enough, and so can any man, no matter how old, if he can add and subtract two figures. No irrigated ranch should, under any circumstances, he laid out without it, and if necessary neighbors should club together and buy one. For small work a carpenter's level fitted with fine rifle sights does fair work if the rod is not over twenty feet away. Errors will amount to nothing if distance of the rod is reduced to ten feet, as most of them will balance each other. Instead of having a rod reading in feet and inches, or feet and tenths of a foot, have it all in inches. The elevation of the telescope will average about four feet above ground, while the variation of levels will not be over two feet. A rod with the figures starting at three feet above the ground and running to five feet will thus give you twenty-four inches, which can be marked off in ink if you have no black paint handy. The remainder of the problem, after adjusting the telescope, is about as intricate as going up town with twenty-four cents, buying a five-cent. cigar, finding a dime, and then figuring out your balance in pocket. There is absolutely no excuse for neglecting it because you can't afford to hire a surveyor and have on your tongue's end the old stock lie "can't teach an old dog new tricks." Maybe you have seen the man who can't write his name. His excuse is "didn't have no schoolin'." The combination of nine letters that make up John Smith is entirely too great for him. But he has not the slightest difficulty with the thirteen cards that make up a suit and the combinations that make a poker hand. Don't imagine you can't run a level because you did not go to a polytechnical school. Get one, and don't lay out a ditch or a bit of land without it. Levelling by the water is too slow where the soil takes much time to dry. The carpenter's level on a beam to be dragged around or an upright on the beam with a plumb bob hanging from it, or a plumb bob hanging from the top of a big triangle will do fair work on a small scale, but for work of any size the telescope will soon save you in time and bother all it costs to buy and learn to use it.

Dairying in Denmark.

By D. CUDDIE,

Dairy Commissioner to the New Zealand Department of Agriculture.

AGRICULTURAL COLLEGE AND EXPERIMENT STATION.

At Copenhagen I visited the Royal Agricultural College and Central Experiment Station, where there is much to be seen and learnt in connection with scientific and practical dairying. This institution is on a very extensive scale, and a great deal of attention is given to all branches of dairy-work in the different laboratories under the guidance of a professorial staff. At the Bacteriological and Chemical Laboratories investigations are continually being carried out to help the dairy industry, and also to check any irregularities which may occur with regard to the manufacture of dairy-produce. The work undertaken is principally of an educational character, and the success which has attended the efforts of the Government to supply the dairy-farmers with information has been phenomenal.

Specially trained men are employed at the Experiment Station, whose services are available for carrying out experiments on the ordinary farms, when necessary, in connection with the tilling and growing of crops and the use of manure, etc. For example, experiments were made some time ago with the growing of mangolds as a winter food for dairy cows. Special varieties were selected and the feeding-value of each ascertained, when it was proved that mangolds are one of the most economical and suitable foods for dairy cattle, and one-tenth of the total area of the country is now used for growing these roots.

Demonstrations have been made to show the farmer how to grow his crops, and also the kind of crops which will return the most money when fed to his dairy stock. The different foods used for feeding cows, calves, and pigs are analysed, and one food is compared with another, and the information is sent out to farmers in bulletins or pamphlets. The relative feeding-value of each food, including those imported, is given, but no reference is made to price, because the cost fluctuates from time to time.

The farmer who could formerly only keep from eight to ten cows is now able to keep twelve to fifteen really good milkers, and rear from thirty to forty pigs in one year. This has been brought about by educating him to know how to work his land to better advantage and to grow the most profitable food for his stock, and by teaching him to cull out the poor cows.

A considerable amount of outside work is also undertaken in connection with the manufacture of butter by the officials of the Experiment Station. These men often go to a dairy factory at the request of the owners, and conduct a series of experiments in order to overcome some difficulty which has cropped up, or to test the efficiency of any new machinery, etc. Other experiments are sometimes arranged on the suggestion of the officials, and any resulting information is placed at the disposal of the factories in general.

Many samples of milk, cream, butter, buttermilk, skim-milk, and whey are collected for analysis at this station, and during last year twenty thousand tests were made to determine whether the pasteurization of these products had been properly carried out at the many dairy factories throughout the country.

PASTEURIZATION.

Pasteurization is compulsory in Denmark, and all milk and cream, as well as the by-products, must be heated to a temperature of not less than 185 deg. Fahr.

As the result of investigations made by Dr. Storch, of the Royal College, a simple test was discovered by which it can be proved if the milk or cream has been heated up to the specified temperature. By adding one drop of paraphenylendiamine and two drops of peroxide of hydrogen and mixing with the sample the colour of the sample turns blue if the temperature used has been too low, and remains unaltered if the correct temperature has been reached.

When discussing the question of pasteurization with Professor Bang, he stated that when the system was first introduced the dairy-farmers were strongly opposed to it, claiming that it would spoil the butter and ruin the dairy industry; but tests were made of the keeping-quality of pasteurized and non-pasteurized butter, which proved beyond doubt that the former was invariably superior. Following this up bacteriological examinations were made, and the evidence in favour of the system as a means of destroying the disease-germs found in the raw material, more especially the tubercle bacilli, was so pronounced that the Government immediately decided to pass a law compelling all dairy factories to adopt pasteurization.

Professor Bang cited a most interesting case of the spread of tuberculosis. A farmer who previously had a herd of cattle which was absolutely free from this disease had his herd retested, and he was astonished to find that, although his old stock was still healthy and free from tuberculosis, the two-year-olds were not, and, what was more unaccountable still, the younger stock, including yearlings, on the farm was altogther free from tuberculosis. The Government officials then made careful enquiries into the case, when it was found that during the time the diseased animals were being reared and fed partly on skim-milk the farmer was supplying a factory where pasteurization was not in vogue. Later on he began sending his milk to another factory where the skim-milk was pasteurized, and none of the young cattle fed on the farm from the time the change was made had contracted tuberculosis.

Professor Bang informed me that, in his opinion, compulsory pasteurization had built up the Danish dairy industry to what it is to-day.

Butter-testing.

While visiting the Experimental Station at Copenhagen a very methodical system of testing the keeping-quality of butter came under my notice, and it was one which, with certain modifications, could, in my opinion, be copied with great advantage in New Zealand.

No less than 1,000 of the 1,350 dairy companies and factory proprietors belong to what is known as a Control Association for testing the keeping-quality of butter, and the members of this association agree to each send a hundredweight cask of butter into the Experiment Station for testing whenever they are called upon to do so.

The tests are carried on under the supervision of the officials in Copenhagen, where a special building is provided for storing the butter and for its subsequent examination. This building is provided with heating and cooling appliances, so that an even temperature can be maintained. So as to prevent any chance of special butter being made for these tests, the members agree to immediately dispatch the butter on receipt of a telegram from the Experiment Station.

The date upon which the message may arrive is unknown to the members, and the custom is to send out a hundred telegrams at one time to factories in different parts of the country. The butter must be forwarded by the next train, and is specially marked for quick transit. The railway authorities take particular care of these specially marked casks of butter, to ensure their prompt delivery at the testing-station. On arrival it is sorted out, and all factory numbers and brands are covered until after the butter is judged, which takes place two weeks later. Three separate rooms are utilized for the work, and three judges act in each room. The judges, nine in number, work in groups of three, composed of one Government expert and two butter merchants. In turn all the groups of judges examine the whole of the butter in the separate rooms, and the averages of all the scores is the number of points finally awarded to the butter. Any material difference between the judges in the pointing of any sample of butter is settled by a consultation of all the judges.

The names of the dairy companies whose butter scores above a given number of points are published in the newspapers, but the names of those who are unsuccessful are withheld. To show how difficult it is to reach the high standard of quality set by the judges it may be mentioned that a special diploma or certificate is given to any dairy company or factory proprietor whose name appears in the published list for ten years without intermission; and only nine have won this coveted distinction during the last eighteen years.

Any depreciation in the value of the butter which takes place during the time it is undergoing the test is paid for by the Government.

All the samples of butter are analysed, and the weight of each cask is checked and reported on, as well as the quality. The importance attached to the testing of butter for keeping-quality by the Danes will be recognized when it is mentioned that, in addition to the test made at intervals the year round at Copenhagen, over two hundred local annual competitions are held for the same purpose in different parts of the country.

A certain amount of this work has been done on a very small scale at the grading-stores in New Zealand. I am satisfied, however, that the system should be extended, as it would also be an admirable check on the grading of newly made butter—which is unattainable under the conditions existing in the Dominion—to say nothing of the splendid object-lesson to the makers themselves.

Co-operation.

One cannot visit the dairy factories and farms without seeing the benefits which are derived from the extension of co-operation amongst the farming community of Denmark.

Of the 1,350 dairy factories in existence, 1,100 belong to the farmers, 200 are owned by individual proprietors, and only fifty private dairies are in operation.

The dairy-farmers seem to combine and work together for advancement and improvement in almost every branch of dairy-work. They join hands, so to speak, to do many things which in New Zealand are left to the individual, or are left undone altogether. The following associations, composed of dairy-farmers, may be referred to as showing the strength and scope of the co-operative systems adopted by the Danes: —

Cow-testing associations.
Butter-competition associations.
Butter-marketing associations.
Cattle-breeding associations.
Egg-collecting associations.
Reading associations.
Milk-judging associations.
Butter-control associations.
Butter-branding associations.
Horse-breeding associations.
Printing associations.
A Statistical Bureau, etc.

Cow-testing.

The most valuable of these is undoubtedly the first on the list—namely, cow-testing associations—which were started in 1895. Only two commenced operations in that year, and at the end of 1907 the number had increased to 473, with a membership of 10,737, testing and keeping the records of 183,618 cows.

The average number of farmers who belong to one association is fifteen, and an official is employed to go round from farm to farm to weigh and test the milk from every cow in the herds, and also to keep the records, including the cost of the feed given to each cow. Each farm is visited twice per month, and samples and weights of the milk are taken at each milking, of which there are usually three per day. It is found that the cows give a larger quantity when milked three times instead of twice daily.

The cost of doing the work, including the salary of the official tester, amounts to Kr. 1·67 (equal to 1s. 11d.) per cow.

When visiting the Island of Fyen, one of the best dairying districts in Denmark, I was informed that 107 associations were in full working order in that district, and the milk from some 42,116 cows was being regularly tested and weighed.

The annual report of the combined associations shows that in 1903-4 422 farmers had herds of cows producing an average of 300 ℔. of butter per cow. The following year the number had increased to 474, while in 1906-7 no less than 633 farmers in this district alone owned herds of cows which were producing a yearly average of 300 ℔. of butter per cow. Last year the average yield of the whole 42,116 cows being tested in the Fyen district amounted to 6,724 ℔. of milk, testing 3·4 per cent., or over 228 ℔. of butter-fat per cow. Referring back to the figures of ten years ago, I find that the average yield per cow was 700 ℔. of milk less per annum than it was last year, and the testing associations have been instrumental in bringing about this satisfactory increase in the returns. Inquiries were made as to the average yield of milk and butter-fat from the whole of the cows supplying the factories in Denmark, and I was informed that this may be taken at 6,000 ℔. of milk and about 200 ℔. of butter-fat per cow, which is probably an average of 50 ℔. of butter-fat per cow higher than in New Zealand.

Many of the cows in Denmark produce over 10,000 ℔. of milk per annum. In one district I visited the number of herds of cows producing between 9,000 ℔. and 10,000 ℔. of milk per annum was forty-two.

At many of the farms visited individual records of each cow in the herd were examined, and as a rule the figures of the latest tests and the weight of milk given could be seen on a small blackboard above the head of each cow, and also the previous year's figures of milk and pounds of butter produced.

The Danish farmers who have cows tested freely admit that the knowledge gained of the performance of every cow in the herd is of immense value to them. They have been able to get rid of the cows which it did not pay them to keep, and to replace them with young stock bred from the best in the herd, with the result that their returns have been greatly increased.

The importance of weighing and testing the milk from any cow in the herd can hardly be overestimated, but comparatively little of this work has been done in New Zealand.

Following the example of the Danes, many of the farmers in Scotland have formed milk-record societies, and the movement is proving a successful one. Cow-testing associations were also started in Canada in 1904 under the direction of the Government, and since that time over sixty associations have been formed, and the information obtained is proving a great benefit to the dairy farmers, who are dispensing with the inferior cows.

Although there are many first-class herds of dairy cows in New Zealand, it is well known that thousands of the cows now being milked are a financial failure; and the time has arrived when something should be done to convince the owners that such is the case.

If the weighing and testing of the milk from the cows in one district could be undertaken by the Department, it would have the effect of creating an interest in the formation of co-operative cow-testing associations throughout the Dominion, and finally result in making dairy farming a much more profitable industry than it is at present.

(To be continued.)

"JOURNAL OF AGRICULTURE."

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Insect Pests and Their Foes.

Fourth Progress Report, by Mr. W. W. Froggatt, F.L.S., Entomologist to the New South Wales Department of Agriculture.

(Continued from page 472 of the December issue.)

I left Constantinople on the evening of April 30, bound for Cyprus, *via* Smyrna and Beyrout, reaching the former town on the following day, when I went ashore and went through the markets, where everything under the sun can be purchased—from old weapons to fruit and vegetables. All the latter were of the same kind and quality as those in the Stambul markets, to which Smyrna sends a large amount of produce. At Beirut the cultivation of the mulberry is the chief industry, and the whole valley of the Dog River, and for some miles beyond the town, is nothing but mulberry plantations, while there were scores of silk-reeling machines and primitive hand-looms for weaving in the houses I passed through. A large quantity of fruit and vegetables is grown in the neighbourhood, and the whole valley was dotted with wells and pumps for irrigating the land. Large quantities of loquats were exposed for sale in the markets (some of rather fine quality), and all the trees in the gardens of the town were covered with nets to protect them from the birds. Green cherry-plums were also sold in large baskets. Very small cucumbers and immature young squashes, with quantities of slender French beans, were the chief vegetables. The large, oblong Jaffa oranges were plentiful, with several small and poor varieties.

Early on the morning of May 8 we anchored off Larnica, and I joined forces with Mr. Clement Reid, of the British Geological Survey, who was visiting the island of Cyprus to report upon its water supply, and travelled to Nicosia in his carriage, a distance of twenty-six miles, over a most barren strip of white, chalky mud and limestone hills and valleys. Wherever there was a bit of land it was planted with barley; but until we came within a mile of the capital there was absolutely no shade or trees except a few Australian wattles planted round the rest-houses and police stations. As soon as we arrived I presented my credentials to the Director of Agriculture (Mr. Saracomenos), and made an appointment to go out next morning to see the methods they adopted for catching the young locusts. The same afternoon we attended a reception at the High Commissioner's, and left our cards. Next day I had an interview with Sir Charles King-Harman at Government House, and obtained his authority to get Mr. Bevan, Assistant Director of Agriculture, to go round the agricultural centres of the island with me. With Mr. Saracomenos I drove out to the low, scrubby hills where the locust-catchers were at work sweeping the ground with large calico nets, shaped in front like a bow, so that the flat side was drawn over the surface of the ground, and the young hoppers fell into a small bag-like appendage at the bottom of the net, from which they were shaken into a small bag that the hunter carried tucked into his belt. We then went down to the Government Camp, and saw the method of buying them by weight from the hunters, who receive a slip giving the amount due to them, which they present at the Treasury for payment. The accumulated catch is shaken into a large sack, which is finally emptied into a pit of quicklime and covered up. Since the time of the British occupation of Cyprus, in 1879, active operations have been carried on against the locusts that breed in the rough, barren lands of the island, and which had, under Turkish rule, often devoured the greater part of the crops grown on the island.

At first attention was turned to the collection and destruction of the eggs, and a tax of 7 to 8 okes of eggs (1 oke equals 2⅘ lb.) had to be paid to the Government by every able-bodied man on the island. This collection started on June 1, and by the end of the year 138,422 okes of eggs had been brought in and buried. Each pod of eggs was found to contain 30 to 35 eggs, and each oke contained from 450 to 500 pods, so that the quantity of eggs destroyed made a total of 2,000,000,000. In spite of this work being carried out, on the following year the locusts did not appear to decrease, and the natives lost heart. In 1881 it was decided to use Mr. Richard Muttei's methods of pits and screens, and until 1897 this was the plan adopted, an income-tax being made law, the revenue of which was used for the expense of killing out the locusts. Screens were erected, and pits dug along the line of march of the locusts as soon as they emerged from the eggs and began to feed, and they were driven against the screens, from which they fell, and, moving downwards, encountered the pits, into which they tumbled, men with spades covering them over with earth and tramping them down when full. In 1883 the Government employed 2,631 men on the work of locust destruction, and 7,543 screens were in use, most of which were in fifty-yard lengths. In the following year 11,085 screens were in use, when the sum of money expended in this work reached to £14,746, and between the years 1881 and 1886 the sum of £66,841 was spent on this work.

The Commissioner, commenting on this expenditure in his report, says:—"Large as this expenditure may seem, it is certain that it has already been recovered by the island many times over in the value of the crops saved. Assuming that only one-quarter of the wheat and cotton, and one-eighth of the barley and oats, would have been destroyed had no vigorous measures been taken to destroy the locusts, the loss to the island would have amounted to £80,000. These figures are derived from the estimated value of the crops, based on the assessment of the tithes of the years 1882-83-84." From this date the Government had the locust plague well in hand, and the operations were reduced, and the expenditure fell to £3,598 in 1894, though it rose again to £7,000 in 1896. At the present time the only methods adopted are the catching of the young hoppers with nets, as previously described, and the amount expended has dwindled down, so that the income-tax has been relaxed. I am informed on very good authority, however, that it must be also taken into consideration that since the British occupation a very large area of land, in which the locusts laid their eggs, has been broken up for cultivation, so that they have been driven into the barren lands, where they can be much more easily dealt with than in the first years of the crusade against them.

On Sunday (10/5/08), accompanied by Mr. Bevan, I left Nicosia and travelled across the island to the town of Limasol, the centre and port for the wine and carob-bean industry. This was a distance of fifty-five miles, with four horses and a coach; the road was over rolling low chalk and marl lands for the first ten miles, and then we were well into the carob- and olive-tree country. The carob-tree grows on very poor soil beyond the area of irrigation, and is apparently as hardy and as long-lived as the olive-tree; the trees are all grafted, and the beans are picked about the end of June—the date upon which the picking is to commence being fixed by the High Commissioner, on account of the fact that the ownership of the trees is so complicated, as many of the trees belong to persons who do not own the ground on which they grow, and if they were allowed to gather the harvest any time, there would be some trouble. In 1906 there were 44,965 tons of carob-beans exported from Cyprus, valued at £157,452; most of these are ground up and made into cattle foods, at least half of the crop going to England. There is a wild species of this tree growing upon the island, but the pods are of no value: it is distinguished from the cultivated form by the natives with a Greek name, meaning "Sent by God," otherwise, self-grown.

I believe that at one time our Department proposed to plant the carob- or locust-tree in the dry parts of Australia, and, as a tree capable of growing such immense crops of edible beans in our stock country, I think the experiment should be revived; young plants or seeds could be easily obtained in any quantity from the Forestry Department of Cyprus. The olive-trees in some parts of Cyprus are very old, so old that in many places the central portion of the tree has rotted out, and each angle has grown round, forming a bunch of three or four trees. These are said to be in many instances four or five hundred years old; yet when we passed through them they were one mass of bloom, and as vigorous-looking as the younger trees. However, as most of the land suitable for olives will grow vines, they do not grow enough olives for their own consumption, and import some olive oil.

We arrived at Limasol late that evening, and called upon the District Commissioners, who had arranged to send us mules to Plateris to take us over the mountains. On Monday morning we started up through the foot-hills covered with vines—for the natives plant their vineyards up to the very top of the mountains, on slopes so steep that it is wonderful how they can gather them. All day long we met caravans of muleteers, with their animals carrying a pigskin of wine on either side of the pack-saddle. As they treat most of their wine with gypsum, and often paint the pigskins on which they carry it to market with a coat of tar, some of the native-made wine has a somewhat strong flavour; but there is an English company which has taken up the wine-making industry, and the export of an improved quality has resulted. In 1906 there was an export of 36,281 gallons of Commandaria, worth £1,993, and 878,059 gallons of other kinds of wines, worth £20,487. The greater part of this wine goes to Egypt, though the English company make shipments to England and Germany. We stopped at the village of Perapidha, when next morning some of the Greek villagers brought me specimens of a small moth grub that was eating off the buds of the vines. Oïdium is very bad on these high lands, and the Government imports large quantities of sulphur and distributes it at a very low rate, or free, to the vine-growers, but they are only just beginning to take the matter up. Later on I found a very curious leaf-gall upon the vines which at first sight appeared exactly like leaf-galls of Phylloxera, but on closer examination appear to be caused by a leaf-mite. Cyprus is one of the few vine-growing places in the world where Phylloxera has not been discovered, and, since the British occupation, no plants of any kind can be imported from countries where that disease is known to exist.

On Tuesday night we camped in the Summer Government House on the top of Mount Troodes (6,000 feet above sea-level), occupied by the Commissioner and his staff later on in the season. Next morning, by winding side tracks, rounded Mount Olympus, still covered with snow, and turned down the great Athalassa valley. The first village we stopped at, Prodromus, is the highest up the mountains on the island, and confines its attention to growing apples. Here, as everywhere else, we found the trees covered with the nests of a small "web worm," a lepidopterous larva that does a great deal of damage. There is another one in the pine forests that often strips the young pine-trees of their needles and covers them with masses of its nests. There was also a large borer in the branches of the apple-trees, but the owner said they were found only on the hillsides. At midday we came into the village of Pedoulous, with very rich black soil, also perched on the mountain side, devoted to cherry- and mulberry-trees, but, as in the upper village, though they were all irrigated from the river coming down the valley, there was no attempt to prune or cut out any dead wood, and many of the cherry-trees were an immense size.

From here downwards we passed through many small villages built along the cliffs, with our path sometimes winding over the flat earthen roofs of the lower houses. At dark we had reached the bottom of the valley, and at 8 o'clock entered the Turkish town of Lefka, where all the oranges on this side of the island are grown, and here we stopped at the Police Station, as there was no hotel or rest-house in the town. Next morning, under the guidance of a zaptieh (Turkish policeman) we went through a number of the orchards, which in most cases were regular thickets, as young trees had been planted or seedlings had grown up all through the place among the older trees. The oranges had been nearly all gathered, but still there were some on the trees, and a great number on the ground. Those upon the ground had been all cleaned of their contents by the rats, and were simply skins. I could find no signs of fruit-flies, nor could I find out from the owners if they ever suffered from the pest; but red scale was very common, and did a good deal of damage all through the orchards, and is just as plentiful in all the gardens about Nicosia.

From here we rode to the railway terminus at Morphou, and returned to Nicosia that afternoon, after a very interesting trip across the island. The Forestry Department in Cyprus is a very important institution, and there is a great deal of the island that is treeless, while the high mountains are covered with fine forests of pines. Mr. A. K. Bovill, who has charge of this work, has planted a great number of different species of Australian trees, chiefly Eucalyptus and Acacia, and at Athalassa has a large area of barren marl and chalk hills covered with thickets of young wattles, which are growing well in very poor, dry soil. He is extending this every year, and hopes before long to supply the towns with firewood, of which at present, round all the towns, they have none, importing charcoal and using a small prickly shrub (*Poterium spinosum*) that covers the low hills to do all their cooking and baking.

In the island there are about a quarter of a million goats, and as there is not a fence on the island, these are shepherded through the forests and open lands, and supply food, milk, cheese, butter, skins for boots, and hair for ropes, bags, etc.; as soon as the forests enclose areas for planting, the villagers cry out they are being robbed of their free range; and the Department says that the goat, from the number of trees it destroys, is their greatest enemy, but it is a vested interest that has to be considered in all forest work. There are about the same number of sheep in the country, usually shepherded with the goats. They belong to the fat-tailed variety, the tip of their tail being twisted like a corkscrew, and the greater number of them is black or piebald. Their wool is almost hair, and the best worth only about 6d. a ℔. The Department of Agriculture is trying to improve the flocks, but finds it very slow work.

The following morning I left Nicosia at 6.30 for Famagusta, and reached there at 10 a.m., when I called upon the District Commissioner (Mr. Travers), who very kindly placed one of his staff and a coach at my disposal to inspect the orange orchards of this district, about three miles outside the town. The soil of this orchard district is very fine sandy loam, all under irrigation, with water that is drawn up from wells about 20 to 30 feet in depth with the old wheel and earthenware jars, worked by a mule. The trees are planted in deep basins about 9 feet between each tree, and the water is distributed from the main channels. For about five months they do not need to use water, but later on once a week, and when the crop is on the trees, twice a week. They could not understand how we could grow oranges anywhere without regularly watering the trees, as they have little or no rain for six months when the crop is ripening. All the trees are budded in a very primitive manner, but all the best oranges and pomegranates are grown in this district. They are quite as large and well-flavoured as any of the Jaffa oranges that come into the market at Constantinople, and besides the long oval form there is a large hemispherical one just as fine. The Commissioner told me that it was the oranges from this place that took the first prize in London at the show.

Though Mr. Saracomenos told me that fruit-fly was a common pest in these orchards, the growers did not seem to think much about it. The "disease," as they call it, that did an immense amount of damage to their trees, and is still very bad, is our common red scale *(Aspidiotus auranti)*. This scale is very common all over the Cyprus gardens, attacking roses, and I even found it on wattles. They are now painting the tree-trunks with lime wash, and do a little spraying after seeing the results of experiments by the Department of Agriculture; but, as one orchardist said, "The Good God sent it, He will take it away," and this is the attitude of both Greek and Turk in the East.

In 1906 there were 8,431,217 oranges exported from Cyprus, chiefly to Egypt, valued at £6,056; while in the same year 42,374 cwt. of pomegranates, valued at £8,107, was exported. A good many mulberries are grown in some districts, and the Department has encouraged the growing of silkworms by seeing that all the seed (eggs) imported is pure; most of this is sold in the cocoon, but a certain amount is made into native silk with hand-looms in Nicosia.

I left Cyprus for Port Said at midnight on the 15th, and reached there early on Sunday morning, 17th, catching the train up to Cairo at 8 a.m., and reaching the latter place at 2 o'clock. I went round first thing the next morning to the offices of the Khedivial Agricultural Society, where I met Mr. F. C. Willcocks, Entomologist to the Society, Mr. Balls, Botanist, and Mr. Hughes, Chemist. This is a private society, but is supplemented with a sum of money from the Government to pay the salaries of the officers, who have well-fitted laboratories and an experiment garden, where experiments on breeding cotton are carried on in conjunction with other crops. I went through their collection, and also over their plots, when we called upon Mr. Brown, in charge of the Gardens of the School of Agriculture, a separate institution, the Director of which (Dr. Fletcher) I met on the following day.

The worst enemy of the cotton all over Egypt is the bollworm *(Earias insulana)*, which lays its eggs upon the surface of the small boll, and the young caterpillars burrow and damage it, so that it falls off and never reaches maturity, much after the same fashion that the larvæ of the American boll-weevil does in the United States. The moth is a very handsome little green creature, and the species found upon cotton growing at the Hawkesbury College and also at Moree, and described in the *Agricultural Gazette* as *Earias fabia* (1903), is identical with this variable and widely distributed species.

The fruit industry is very poorly represented in Cairo; most of the best oranges are imported, and it is very curious that while there is some red scale upon the orange-trees here, the common and by far the worst scale of the citrus-trees in Egypt is the round scale *(Aspidiotus fici)*, the fruit often being thickly encrusted with the scale. There is quite a number of apricot gardens around Cairo, but the trees are let run wild, apparently all seedlings, and though they are irrigated the fruit is very small and is gathered by shaking the trees and picking it up from the ground. In the market there was a great quantity of fine vegetables of all kinds, and on several stalls I saw bundles of vine leaves for sale; the seller told me that the Arabs slice them up and eat them with rice.

I visited the Survey Department, where I saw all the plans of the Nile Delta lands, with their thousands of little plots of freehold land, often only three yards wide and a couple of hundred yards long—yet they keep a family. At the Veterinary Department I met Mr. Littlewood, who gave me some notes on the many diseases that attack the stock, and said they had not the least idea of the number of sheep or horses in Egypt, but roughly there were 718,000 cattle and 781,000 buffaloes on the returns for 1907; great numbers of stock of all kinds were imported every year for food, while 44,000 camels were also imported from Asia for food last year.

In going through the entomological collection, while Mr. Willcocks had no specimens of the fruit-fly *(Dacus longistylus)* that has been several times recorded from Cairo, I found he had a number of specimens of our Mediterranean fruit-fly *(Halterophora capitata)*, which, as far as I know, has never been recorded from Egypt. These were bred from Egyptian oranges.

Produce Export Notes.

Extracts from the Commercial Agent's Reports.

LONDON, December 4, 1908.

LAMBS.

The market at the moment, owing to the continued heavy supplies of Dutch lamb, is in such a condition that it is almost impossible to sell frozen meat at any price Some time ago New Zealand shipments were being bought up almost as quickly as they arrived; it now turns out that the buyers were speculators, and were expecting a strong market later on. As previously explained, this unforeseen supply of fresh meat has completely upset their calculations, and they are now endeavouring to quit at any price. I have found out this last week that in six cold stores in London alone there was an aggregate of over 200,000 carcasses of New Zealand lambs, and of course it is possible that there may be more that I do not know of. The arrivals last month of New Zealand lambs were 50,000 carcasses, and Australian 50,000 carcasses.

BUTTER.

The surprises in this connection are almost more pronounced than in the lamb trade. The market for the last week has been in a state of collapse, and it is utterly impossible to sell, except from hand to mouth. The present value of finest Australian butter is anything from 103s. to 105s., and no one seems prepared to say whether the bottom is reached or not. Business failures are taking place daily, and agents are almost afraid to trust anyone.

LONDON, December 11, 1908.

HONEY.

On account of the many other attractions at Christmas, the demand for honey has, as anticipated, fallen off, but with a little energy I have no fear of being able to revive sales after the New Year. I would again remind the beekeepers that they have keen competitors in the market, and the honey by no means sells itself. It needs a considerable amount of push, and a little money judiciously spent in advertising is certainly necessary if the splendid start we have made is to be maintained.

BUTTER.

Yesterday a meeting was held composed of persons interested in the colonial butter trade, with a view to adopting some means to better control the marketing of Australian and New Zealand butter. Owing to a previous important engagement, I was unable to attend. I however notified the promoters to this effect, and one of them waited on me beforehand and obtained my views on the subject. I also informed him that if desired I was prepared to act on the committee, as I understand it is their wish that a Government representative from each of the States and New Zealand should be on the committee. The general principle of their scheme I consider excellent. It must certainly tend to minimize the possibilities of a recurrence in future seasons of what has happened this season. I have since been informed that nothing definite was done at the meeting yesterday except to form a sub-committee to draft definite lines on which to work, the same to be submitted to a meeting to be held in about a fortnight. One proposal that was brought forward, and necessarily created a considerable discussion, was that in future c.i.f. business in butter should be discouraged, and that the whole of the business should be done on consignments. For many reasons I am in entire sympathy with this, but I was careful to point out to the gentleman who called upon me that I had no authority to speak on behalf of private shippers, but when the time arrived I would be quite prepared to make a recommendation through the Government.

The market generally may be now considered to be steady. The "Mooltan" shipment caused me considerable anxiety, because several large Tooley Street buyers were offering first Victorian at 102s., which made it quite impossible to sell butter similar to Map brand at a price that would have covered even the cost. As a result of the system we organized last year of distributing the brand throughout the country to small buyers, the whole shipment has been cleared at prices ranging from 104s. to 108s. The colour and salting being right, these 620 boxes were distributed up between Glasgow, Leith, Manchester, Liverpool, Cardiff, Bristol, Newcastle, and Birmingham.

LAMBS.

The market is much the same as last week, and certainly there is little chance of any improvement this side of Christmas. To move any quantity would mean accepting very low prices, and I am accordingly not rushing sales, seeing that at present our stocks are not heavy, but am letting them go in small lots. At the time of writing I have sold ex s.s. "Durham" 61 Cross Keys at from 4⅝d. to 5⅛d., and about 20 Australs and Curlews averaging 4⅛d. and 4d. respectively. At the same time, while I am not pushing sales at present, I am carefully taking into consideration the cost of storage, and will watch that shipments do not to any extent exceed store limits whereby there would be any chance of extra storage expense being more than the difference between holding and selling in parcels at low rates. My attention has been called to a parcel of lambs shipped from Sydney ex s.s. "Somerset." While I should not care to class these lambs as "emaciated," yet at the same time they were a very poor lot, and no credit to Australia, and, as I have previously pointed out, tend to depreciate the value of South Australian lambs as a whole. The "Whakarua" has arrived, and from what I have seen the lambs appear to be a very useful consignment.

THE APPLE SEASON.

In connection with this season's export of apples, the following cable message has been received from the Commercial Agent in London:—"Apples.—Market is firm, consider prospects of good returns excellent."

LONDON, December 24, 1908.

LAMBS.

There is very little fresh to report. No further shipments are to hand, although two or three are expected during the next week. Business is practically done for the year. I have every hope of a better demand in the new year, and feel confident of being able to sell our consignments to good advantage. The "Durham" shipment is going out in small lots at prices ranging from 4d. to 4½d. per ℔. I hope to clear up by the end of the next week. About 160 lambs ex "Whakarua" have gone out, returning from 4d. to 4¼d. for Curlew, and 4½d. for Austral. I could not, however, sell quantities at this price. Good Adelaide lambs are being offered at 4½d., and the medium grades at 4d. for parcels.

BUTTER.

Danish has had another knock-back of 5s. per cwt.; this has seriously affected Australian. During the week, "choicest" Victorian butter has been offered at 102s. to 104s., whilst "finest" has been offered at as low as 98s., and even at these prices many merchants have been unable to clear stocks. The "China" shipment has gone out in the usual way at the following prices:—6 boxes at 106s., 4 boxes at 105s., 44 boxes at 104s., 30 boxes at 103s., 247 boxes at 102s. I accepted 102s. rather than risk carrying the butter over until the new year and incurring storage charges, especially as a lot of other brands will be carried over, and there is no immediate prospect of an improvement in prices.

INTERNATIONAL DAIRY CONGRESS.

Programmes have been issued for the Fourth International Dairy Congress, to be held at Budapest in June next.

FLOUR.

As the result of my lectures, I have had an application from a gentleman interested in the flour trade for samples and prices of South Australian flour. He states that he is prepared to purchase parcels of 500 tons at a time, provided the quality and price suit. I would therefore be glad to receive samples by an early mail, and would suggest that a code be sent in order that the latest quotations may be cabled from Adelaide, when it would be known the samples were here, quotations to be c.i.f., London. This gentleman was particularly interested in the experiments that I informed him we were carrying out regarding the various wheats.

LONDON, December 31, 1908.

BUTTER.

Contrary to expectations, the market has advanced 3s. to 4s. This is no doubt due to two causes:—(1) The report that the "Paparoa," with 37,000 boxes of butter, is on fire off Teneriffe. (2) The very sudden change of weather; from close and muggy a week ago, it has now set in with severe frost and snow throughout England, and in many parts of the butter countries of Europe traffic is totally suspended.

Refrigeration and the Meat Industry.

The third of a series of lectures which is being delivered at the College of Agriculture, Edinburgh, by Professor Loudon M. Douglas was given on November 30 last, and was on the subject of refrigeration as applied to the meat industry. The lecturer stated that the early history of refrigeration was somewhat obscure, and he proceeded to give examples of the early application of cold in its primitive forms. Records of the cooling business, however, did not begin until the nineteenth century, and even then it was not till about 1850 that we might say that proper records became available. About that time the natural ice business had grown to great dimensions, and it would appear as if natural ice had become the principal source of cooling effects in all countries. In 1834 an English patent on the subject of the utilization of compressed gas as a refrigerating agent was taken out by Joseph Perkins. In France also, in the fifties, Carré had worked at refrigeration: first with ether, and then with ammonia. From 1860 to 1870 was a busy time in the developing of refrigerating machinery, and it then became apparent that the natural ice business would soon become a thing of the past. In 1879 Bell and Coleman installed refrigerating machinery on board the "Strathleven" and brought the first cargo of frozen meat to London, and since then the fleet of steamers which was engaged in this business had become an enormous one.

The method of application to the meat industry of cooling effects had three principal aspects:—

(*a*) Fresh meat storage in abattoirs or in shops.
(*b*) Pig-chilling and bacon-curing.
(*c*) The import of frozen meat.

By means of a very complete model the lecturer was able to show the construction of an ideal cooler, by which it became possible to circulate the air of a room or any number of rooms, and he proceeded to say that in connection with fresh meat the circulation of the air was indispensable, as it was also for chilling purposes; but that where meat was required to be frozen, there did not exist the same necessity for air circulation, but a better method was first of all to chill the meat by circulation, and to subsequently reduce its temperature further by means of still air until it reached any degree above zero that might be considered necessary.

In conclusion, it was pointed out that in the storing of meat, as in the cooking of meat, muscular tissue must be regarded as an extremely bad conductor of heat, and, as a consequence, can only be chilled or frozen slowly. Conversely, it can only be thawed out slowly. The reason why frozen meat decomposes so much on the surface is because of the rapid thawing out of the tissues there, and while the centre of a piece of frozen meat may be perfectly hard and sound, decomposition may have set in on the outside surfaces which have been exposed to a high temperature. In cooking, the non-conductivity of meat is illustrated by the fact that it takes a long time before the heat of cooking or roasting reaches the internal parts of the muscular tissue; bones, however, were good conductors, and thus they acted in an entirely opposite way to muscle, and this explained why in cooking it was found that the meat close to the bones might be perfectly cooked and at the same time the internal part of the muscles might be in an uncooked state.

WHITE SHORTHORN CATTLE.

"Dry Bible."

Similarity to "Lamziekte."

Bonemeal as a Preventive.

Mr. J. F. McEachran, Inspector of Cattle, has presented the following report to the Secretary of the Metropolitan Dairies' Board:—"I have the honour to direct your attention to the following report *re* the similarity of the disease 'dry bible,' or 'cattle paralysis,' to the South African disease 'lamziekte.' The Stock Department of South Australia has long recognized the close relationship of the two diseases. In the September copy of the *Comparative Journal of Pathology and Therapeutics* Mr. Spreull, M.R.C.V.S., describes in detail a series of interesting experiments which has recently been conducted regarding this disease 'lamziekte,' and the results are extremely interesting. Mr. Spreull attributes the cause of the disease to a specific organism—a cocco bacillus—which has been successfully isolated from the submucosa of the fourth stomach and the small and large bowel. It has been cultivated on artificial media in the incubator, and it has proved virulent on inoculation into healthy animals. Mr. Spreull states that the disease seems to be neither contagious nor infectious in the ordinary sense. The virus doubtless escapes from the economy of the sick animal in its fæces and other discharges, and remains in the soil or water. Although Mr. Spreull has no good reason for doubting that the disease 'lamziekte' is caused by a specific organism, he gives a number of exciting causes which apparently play an important role in its production. The disease is always present in the hottest weather when the rainfall is desultory and insufficient, and cases keep coming on until good rains fall and put the veldt in good condition. 'Lamziekte is most prevalent when the grass shoots up and again withers away. A craving for bones is observed in the affected districts.

"Mr. Spreull deprecates the use of medicinal agents to cure this disease, but he advises prevention, and in this connection he states:—'Convinced, as I am, that the complaint known here as 'lamziekte' is not a bone disease, it seems strange that we should turn to the administration of sterilized bonemeal in the form of a lick as our foremost and best-tried means of prevention. Cattle well supplied with this lick scarcely manifest any depravity of appetite; but, more remarkable still, they do not contract 'lamziekte' in anything like the same proportion of cases, and probably when they are attacked the disease is less severe. Bonemeal is evidently a good tonic. Its phosphates are a necessity to the food ration, and should these be proven deficient in the grasses and bush of the varied areas in which this disease abounds, the benefits accruing from its administration will be further explained in the results, which are that the stock is thus kept in a state of exuberant health. In view of the analogous nature of the South Australian disease to the South African one, Mr. Spreull's investigations are very significant. Experiments and investigations should be undertaken in this State with the disease 'paralysis,' and an endeavour should be made to isolate the bacillus—if it does exist."

The Minister of Agriculture has received a report on "dry bible" in the northern districts from Mr. T. H. Williams, Deputy Chief Inspector of Stock, who believes that "a great percentage of the deaths which occur over wide areas of the State, and which are put down to the score of 'dry bible,' is really due to poisoning, either from eating poisoned baits laid for, or the carcasses of, poisoned rabbits. The baits generally kill rapidly, but many animals linger for days after they eat poisoned carcasses, during which time they may not get water, or cannot swallow it; as a result the contents of the stomachs, including the omasum, dry up, and if they happen to be opened after death the cause is pronounced to be 'dry bible.'" He also thinks it "more than likely that some of the endemic outbreaks of paralysis which occur among cattle all over the States may yet be discovered to be due to their eating with their food some of the poisonous fungus growths which are known to exist on grain, stubble, grasses, weeds, etc."

As regards prevention, Mr. Williams says:—"I have previously pointed out how straw may be converted into a useful and safe food for loose stock on the farm, and am pleased to say several farmers have acted on my suggestions. Others have told me it costs them only about 7s. 6d. per ton to treat the straw with molasses, salt, and sulphate of iron. They further say it is now worth £4 per ton for feeding young stock on because it saves hay. Surely the statements made by many of our best farmers, who say they have not had losses from 'dry bible' since they supplied their stock with plenty of salt and sweet bonemeal, are worthy of some credence."

On a Cattle Station.

Poultry Notes.

By D. F. LAURIE.

The year 1908 will be a memorable period—the first during which the producer received what may be called a fair price for eggs. Looking back through the records of previous years, when low prices ruled, one is inclined to marvel at the steady growth of the poultry industry in spite of long periods of unpayable prices for eggs. With regard to the demand in the other States for our surplus eggs, Western Australia shows a heavy decrease in the quantity imported, and the other States record more or less falling-off. It has been stated that the Customs' figures are not to be depended upon. Of course, if the merchants interested allow that statement to pass unchallenged it will be tantamount to an admission that false declarations are the rule. I think the Customs' figures can be relied upon as correct. The reason for high prices is twofold. Firstly, it was notified, as usual, that shipments would be made to England, and without doubt the knowledge that shippers can net an average of 7d. to 7½d. a dozen on all grades tends to make the bedrock price somewhere in sympathy with that quotation. The other States do not produce sufficient eggs for their needs, therefore for the quantities they require it is but just that they should pay about 2d. a dozen more than they paid in former years. Had the prices remained low there were plenty of speculators ready to try the London market. Even at the abnormally high prices for eggs in Adelaide this season, shipments to England would have paid well, as there was a great scarcity and very high values.

POULTRY FOR EXPORT.

This year there has been a scarcity of table birds generally and good ones in particular. Several breeders recorded excellent returns for all chickens and ducklings up to Christmas, and even now the prices are much higher than is usual at this time of year. This season the number of birds exported will not equal last year's output. To hold the London buyers it is necessary to ship only really well-fatted young birds, so I intend to grade rigidly and reject anything not up to the mark. I think prices will be good this year, and all poultry-owners should assist in developing this branch of the industry.

EGG-LAYING COMPETITION FOR 1909-10.

The Hon. Commissioner of Crown Lands has authorized an egg-laying competition to be held at the Government Poultry Station, Roseworthy Agricultural College. One hundred and twelve entries have been received, and this forms a record for the State. Many entries have come from Victoria and New South Wales. The competition will begin on April 1 and end March 31, 1910. The Hon. Commissioner has allotted £65 in prize-money, the awards to be based on the market values of eggs laid. There will be 672 competing pullets and about 1,200 layers and breeders on the Government Station. The bulletin issued at the termination of the 1907-8 test was widely distributed, and the published results of test have given the breeders in Europe and America much food for reflection. The official bulletin on the results of the present competition will be available the first week in April next.

Animal Food for Poultry.

The Produce Department is now manufacturing a very fine sample of meatmeal, which is put upon the market at a reasonable rate—about 2d. a ℔.—in bags of 7 ℔. (1s. 6d.), 14 ℔. (2s. 6d.), 28 ℔., 56 ℔., and 1 cwt. Many manufacturers of meatmeal use old horses, etc., and others make meat extract and sell the residue as poultry meat. The process of manufacture at the Depot will satisfy the most fastidious. The plucks are fresh and clean, and all the processes are carried out by machinery, with the result that the poultry meatmeal is practically fit for human consumption. It is very rich in albuminoids, which are the flesh- and egg-making portions of food. There is practically no waste—a fair amount of salts and a due proportion of fats. From ½ to ¾ ℔. is sufficient for 100 adult fowls. It is used as follows:—Take the necessary quantity and pour hot water upon it until you have sufficient soup to mix with the soft food (bran and pollard). Give this three or four times a week, or daily, if forcing for egg-production. Where soft food is not given, take the same amount of meatmeal and pour on just enough hot water to swell it out. Rub dry with bran or pollard, and place in dishes for the birds. This meat will keep indefinitely, but should be stored in a ventilated metal-lined bin. For duck-rearing meat-food is absolutely necessary, and some fat may be added with advantage when topping off. Pure tallow is excellent for fattening ducklings.

The Apple Crop.

Alternation of Fruiting Seasons.

By Geo. Quinn, Horticultural Instructor.

In many districts of South Australia the crop of apples is so light this year that one has to search carefully on some of the trees to find a single fruit. In some districts of the Hills scarcely an apple is untouched by codlin moth, the pest having concentrated on the few fruits available, in addition to which the trees in the early part of the season had an absolutely barren appearance, so that repressive measures were considered unnecessary. The Mount Lofty district carried a very good crop last year, while the Angaston district, which had a very light yield last year, has this season an exceptionally fine lot of fruit.

The subject of the irregular fruiting of apple-trees from year to year is engaging the attention of horticulturists in all parts of the world where apple-growing has risen to be a distinct industry. In Europe and the eastern States of North America, where the climatic conditions are much more severe, it is only reasonable to assume that this factor has a great deal to do with the irregular cropping, as distinguished from the cropping in alternate years, which usually occurs in Australia. It is generally accepted that certain varieties of apples only fruit in alternate seasons, and although no absolute evidence is yet available, minor tests have been made with a view of ascertaining whether this habit is a fixed characteristic or only due to the physiological effects of carrying a heavy crop of fruit. In connection with the spur-forming pip-fruits, such as apple and pear, it is a well-known fact that usually the energies of the spur are so concentrated in the development of the fruit that the extensions, unless the spur is exceptionally strong, rarely terminate in another flowerbud; but on those spurs which do not bear fruits there is a greater chance for the extension to develop a matured flowerbud for the next season's crop.

Under South Australian conditions there appears to be some evidence that more even production of apple crops may be attained by the following means:—Suitable tillage and feeding of the trees, systematic repression of diseases, regular pruning of not too drastic a character and adapted to the needs of each variety, thinning out of fruits when very heavily set upon certain kinds, which is done with the object of producing a better sample, and, finally, the mixing together, in a plantation, of a fair number of varieties which blossom approximately at the same period. This would appear a fairly large order to carry out, but it embodies nothing more than what is being done in a number of our best-kept orchards. In the great majority of the orchards of this State the careful manipulation of the branches and spurs of the apple-trees has not been carried on for any great number of years, and, in fact, the generally accepted idea is that after an apple-tree reaches the bearing stage, there is practically no further need to prune it, excepting to occasionally thin out a limb here and there; but Professor L. H. Bailey's reference to the peach and the grape-vine opens up room for thought in the direction that pruning operations should be carried along lines which imply that, while certain operations are devoted to repairing waste and producing ripened fruitbeds, others should be devoted at the same time to the production of fruit for that season. It is very obvious that if the grape-grower and the peach-grower were to act upon the lines adopted by the apple-grower, their plants would not only resort to a system of alternate bearing, but very soon would come to a condition when even this result could not be depended on. Personally, I am of opinion that to remedy this irregular fruit-bearing habit our trees must be more systematically treated, but to what extent this must be done will depend very much upon the conditions which prevail in the locality and upon the varieties which are grown.

Poisoning Grasshoppers.

Throughout South Africa the trouble with grasshoppers or locusts is a perennial one, and in several of the States special Government Departments have been organized to direct and control measures for their suppression. Poisoning with some form of arsenic is usually resorted to, and most satisfactory results are secured. The following account of the system of dealing with a large swarm in the Transvaal —which is typical of the treatment usually adopted—is taken from *The Pastoralists' Review:*—

"The swarm destroyed was a very large one, covering an area 500 yards long and 200 yards wide. They were in the hopping stage, and travelled closely packed together. They had already consumed every green thing on the adjoining farm. A single pound of arsenate of soda sufficed to destroy the whole swarm. The poison was mixed with 4 lb. of brown sugar, and dissolved with hot water in a boiler. Then cold water was added until a quantity of 12 gallons was made up. Six ordinary bundles (about 36 lb.) of green barley were soaked in it for about fifteen or twenty minutes. The barley was not entirely immersed, but each bundle was loosened so that each stalk could fully absorb some of the liquid, of which about one-third was absorbed by the barley.

"By waving flags the swarm was brought to a standstill close to the boundary of the farm. Then the barley was thinly scattered both in front of and among the grasshoppers, in the following manner:—Single stalks were scattered in thin rows over the swarm, each stalk in a row at a distance of about 4 ft. from the other, and each row of stalks ten yards from the next row. In front the stalks were laid thicker. In this manner the barley was distributed over the major portion of the swarm. The rear of the swarm was not interfered with, as there was not sufficient barley. This was, however, of no consequence, as later on the grasshoppers closed up towards the front, and so were enabled to reach the poisoned bait.

"As soon as the poison had spread amongst the swarm they came to a sudden halt. There was no need for further flag-waving, as the grasshoppers no longer showed any desire to spread over the field. The creatures attacked the barley with avidity. Every stalk was covered with hundreds of grasshoppers, which were all poisoned. Before sunset numbers of the insects appeared sick, but so far none had died. About eight gallons of the poisoned fluid was left over. This was used in the following manner:—In the evening a number of the grasshoppers where they were thickest was killed by blows from bushes. The bushes were steeped in the poison, and thus the hoppers were plentifully sprinkled with it. On the same evening the remains of the poisoned barley were carefully collected and burnt.

"Next morning about one-third of the hoppers were dead, and the survivors were busily devouring them. No more poison was needed. Thenceforward the destruction proceeded automatically. In four days the whole swarm was annihilated. It is remarkable that birds which for two days had fed on the dead hoppers did not seem any the worse for it. The work was very easy, two whites and two natives having been employed only two hours over the business. From the moment the poison was strewed over the swarm they made no attempt during the four days to move on."

House-building in the Back Blocks.

A Cool, Cheap Dwelling Wanted.

(Continued from page 529 of the January issue.)

No. III.—By J. M. **Brand**, Renmark.

The house I would recommend is built with what is known as the adobe wall. For appearance, solidity, and cheapness it is hard to beat. The walls consist of earth of a loamy nature—about half-way between clay and sand. The material is procurable in almost any district, and is taken from the surface for about a foot deep. This earth is damped over night for the next day's use, and the whole secret of success lies in the damping. It must all be made damp, and not wet, care being taken not to have any dry lumps in it. A layer of this earth is placed loose between boards, distributed equally, and then rammed with an ordinary floor-rammer until you can make no further impression on it; then another layer is put in, and so on.

When the first boards are taken off the wall is so solid that you can place the boards on top as soon as you have finished one set, and ram away again. When the wall is finished and dry it should be oiled with boiled oil, and you then have a structure that will almost resist a nail being driven into it. All the outlay, with the exception of labour, is for lintels, wallplate, bolts, and oil.

All the plant required—and this could be bought collectively or lent by the Government—consists of four boards, 18 in. by 1½ in., and say 12 ft. long, cut square on the ends, so that when the boards are level the corners are upright. Providing you start square and level and fill the space between the boards each time the wall must go up square and level. Two of the boards should be longer than the other two by the width of the wall, so as to bring the ends level. You also want ten bolts, long enough to go through the wall and the boards, made of ½-inch iron with square heads and furnished with a point, so as not to damage the thread when knocking them out. These bolts go through the boards and rest on the wall. For the top of the boards clamps are used, which are made of 1-inch by ½-inch flat iron, and are dropped over the boards. When the layer is finished they are simply knocked up, the bolts are withdrawn, and the bolt-holes filled at the ends.

The boards are held together at the corners on the outside by means of four pieces of iron, and the inside boards are rabbited. The boards should have holes pierced along both sides every 3 ft. at a distance of

3 in. from the edge, so as to allow them to overlap the wall, and should be screwed up tightly. It is necessary to have two boards made the width of the wall and cut square to place at the end of the long boards, or at any of the bolt-holes to cut the joints in the wall. It is a good plan to put tar on the foundation to prevent damp from rising.

There are several houses of this kind in Renmark, some of them fourteen years old. Under ordinary circumstances it takes two men three weeks to put up two rooms 15 ft. x 15 ft. and 9 ft. high, with a 15-inch wall.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, January 13, there being present:—Messrs. G. R. Laffer (chair), A. Molineux, C. J. Tuckwell, C. J. Valentine, C. Willcox, Professor Perkins, Colonel Rowell, Messrs. G. Jeffrey, A. M. Dawkins, and J. Miller.

The Secretary reported that the Sale of Chaff and Fruit Act was now in operation, the standard weight of the bag of chaff having been fixed at 40 lb. Some discussion took place in reference to certain clauses in the Act, and Mr. Willcox stated that it had come under his notice recently, where chaff had been delivered, without it being stated on the cart-note whether the bags were full weight or not. The bags had been weighed by the purchaser, with the result that in no case did they exceed 40 lb., bag included, which meant that there was at least 2½ lb. short weight of chaff. In reply to question, the Secretary stated that the regulations would be prepared shortly to give effect to the Act.

The Secretary reported that the Hon. Minister had approved of another trial of stone-gathering machines being held, and it was probable that this would take place some time about the end of August.

The Hon. Minister intimated that he could not agree to the recommendation of the Board that the Assistant Veterinary-Surgeon should be stationed at Roseworthy Agricultural College. Mr. Dawkins expressed regret at the decision of the Hon. Minister, as he was of opinion that the veterinary would be of far more service to the State if he were stationed at Roseworthy. At Roseworthy he would have far more opportunities for investigation in the centre of a very large farming district, while at the same time the chief veterinary would be stationed in Adelaide. It was decided to ask the Hon. Minister to reconsider his decision on the subject.

The Secretary reported that he was making enquiries in regard to the alleged smut-resistant wheats, but from published reports in the

Eastern States it did not appear that these wheats possessed any special power of resistance to smut.

The Secretary of the Caltowie Branch advised that the Annual Conference of the Northern Branches of the Agricultural Bureau would be held at Caltowie on February 17, and invited the members of the Board to attend. Several of the members intimated their intention to accept the invitation.

The following gentlemen were approved as members of the undermentioned Branches:—J. C. Wallace and E. P. Yateman, Kingscote; W. E. Muspratt, Renmark; C. Dodds and L. Edwards, Lameroo; J. Robinson and J. Wurtel, Balaklava; E. H. Hunt, Wirrabara; W. Oswald, Lipson; A. J. Whillas and J. K. Telfer, Greenpatch; G. Phillips, Hartley; T. Harper, J. Richards, E. A. Chase, Clarendon; J. Scriven and H. Loftes, Morchard; J. Palmer, J. Hay, M. O'Shea, L. Duncan, and A. Fisher, Tatiara.

On the motion of Colonel Rowell, Messrs. A. M. Dawkins, J. Miller, and C. Willcox were appointed a committee to act with the Principal of the Roseworthy Agricultural College and the Director of Agriculture in supervizing the trials to be made with wheats competing for the prizes being offered by the Government.

BONUS FOR STONE-GATHERING MACHINE.

A bonus of £100 is offered for an efficient stone-gathering machine.

A public trial will be held in August, 1909, and entries must be made to the Department of Agriculture, Adelaide, not later than July 1, 1909.

The amount of bonus may be allotted in two prizes, but no prize shall be awarded unless recommended by the judges.

Machines will be required to remove or gather into convenient rows all stones of not less than 4 in. across their longest axis, and not exceeding 28 ℔. in weight.

Further particulars may be obtained on application to the Department of Agriculture, Adelaide.

Points that will be Considered in Judging Machines.—(1) Efficiency and cost of clearing; (2) lightness of draught, strength of machine, simplicity of construction and working; (3) cost of machine; (4) gathering stones free from soil.

L. O'Loughlin,

Minister of Agriculture.

The Wheat Market.

Wheat prices remained steady throughout January. Farmers' lots on trucks at Port Adelaide were worth 3s. 7½d. per bushel at the beginning of the year, and a rise of 1d. took place on January 12. Prices in Melbourne and Sydney reflected those of Adelaide, the former being about our own level, and the latter ½d. to 2d. higher. On February 8 the price at Port Adelaide rose to 3s. 10d., and on the following day to 3s. 10½d.

Beerbohm's Evening Corn Trade List says the coming year promises to be a very interesting one in the wheat trade, and makes the following remarks on the position at date December 24:—"The market during the past week has fluctuated somewhat but on the whole has shown a somewhat decided resistance to any further decline, partly owing to the extraordinary conditions in America and Canada, from which countries it is difficult, in spite of the decline in new crop La Plata, to buy wheat for shipment after December at anything like present prices on the spot here. The Argentine crop reports are still somewhat conflicting, but on the whole more favourable, and indicate a probable yield not more than 10 per cent. below last year's, so that the present feeling is that the surplus may reach 15,000,000 quarters, against 17,500,000 quarters in the past year. Large shipments in the early months of next year are therefore to be expected, and as they will be supplemented by big exports from Australia, the total for Europe may prove to be large enough to, at any rate, keep the market in check."

The same authority adds:—"The cause of the relatively high level of prices which has prevailed during the past two years is apparent in the returns. An average production for the whole world of 392,000,000 quarters in 1907 and 1908, compared with an average of 411,000,000 for the previous four years (1903-6), must, it may be reasonably believed, result in a considerable deficiency somewhere, which could only be met by drawing upon reserve stocks, a process which will obviously result in very small stocks on hand at the close of the present season. . . . The coming Indian crop, to be reaped next March-April, may, however, prove to be a very large one, and this contingency is one which helps to prevent wheat operators from indulging in extravagant views of future prices."

Freights for wheat parcels to the United Kingdom have risen steadily during the past few months. They were 15s. per ton in September last, and now stand at 24s. to 25s. Owing to the satisfactory harvest in the Eastern States, scarcely any wheat is going forward to Melbourne or Sydney, but a good deal of barley is being exported to those places at a freight of 10s. per ton to Melbourne and 15s. to Sydney.

Date.		LONDON (Previous Day). Per Bushel.	PORT ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Jan.	6	Unchanged	3/7½	3,7½ to 3/8	3/8
	7	Quiet ; Liverpool 4/9¾ s afloat ; 4/6⅜ Jan.	3/7½	3/8 to 3/8½	3/8½
	8	Steady ; Liverpool 4/6¾ s. Jan.	3/7½	3/8 to 3/8½	3/8½
	9	4/7⅛ (sailer) ; 4/6¾ (steamer) Jan.	3/7½	3/8 to 3/8½	3/8½
	11	Unchanged	3/8½	3/8½ to 3/9	3/9
	12	Slow ; Liverpool dull ; 4/9¾ s. afloat	3/8½	3/9	3/9 to 3/10
	13	4/7⅓ s. Jan. ; Liverpool 4/7⅛ Jan.	3/8½	3/8½	3/9 to 3/10
	14	4/7⅛ s. Dec. ; 4/6¾ s. Jan.	3/8½	3/8½	3/9 to 3/10
	15	Unchanged	3/8½	3/8½ to 3/9	3/9 to 3/10
	16	Quiet ; Liverpool 4/7⅞ to 4/10 s. afloat	3/8½	3/8½	3/9 to 3/10
	18	Unchanged	3/8½	3/8½	3/9 to 3/10
	19	Slow ; Liverpool 4/7⅞ s. afloat ; 4/6¾ s. Jan.	3/8½	3 8½	3/9 to 3/10½
	20	Firmer ; 4/6⅝ Feb.	3/8½	3/8½	3/9 to 3/10½
	21	Firm ; 4/6 Jan. ; Liverpool 4/6¾ Jan.	3/8½	3/8½	3/9 to 3/9½
	22	Liverpool 4/9 s. afloat ; 4/7½ s. Jan.	3/8½	3/8½	3 9 to 3/9½
	23	Firmer ; Liverpool 4/7⅞ s. Jan.	3/8½	3/8½	3/9 to 3/9½
	25	Unchanged	3,8½	3/8½	3/9 to 3/10½
	26	4/6¾ Jan. ; 4/7 Feb. ; Liverpool 4/10¼ s. afloat	3/8½	3/8½ to 3 9	3/9½ to 3/10½
	27	4/7⅛ Jan.; Liverpool 4/9⅜ afloat ; 4/6¾ Jan.	3/8½	3/8½ to 3/9	3/9½ to 3/10½
	28	4/7⅛ Jan. Liverpool 4/7½ s. Feb.	3/8½	3/8½ to 3/9	3/9 to 3/10½
	29	4/7 Feb. ; market firmer...	3/8½	3/9½	3/10½ to 3/11
	30	Steady ; 4/7⅛ b. Jan. ; Liverpool 4/7½ Jan.	3/8½	3/9½	3/10½ to 3/11
Feb.	1	Unchanged	3/8½	3/9½	3/10 to 3,10½
	2	4/7½ Jan. ; Liverpool 4/10⅞ s. off coast	3/8½	3/9 to 3/9¼	3/10½
	3	Firm ; 4/7½ Jan./March	3/9½	3/9 ex store	3/11
	4	Less active ; Liverpool 4/7½ Feb.	3/9½	3/9½	3/11
	5	Firm ; 4/8¼ Jan. ; 4/7⅞ Feb.	3/9½	3/10½	3/11¼ ; 4/- s.

FREIGHTS.—Port Adelaide to London or Liverpool, per steamer, 24/- to 25/- per ton (7$\frac{7}{10}$d. to 8d. per bushel) for wheat parcels ; per sailer, 21/3 to 23/- (6⅘d. to 7⅖d. per bushel). Port Adelaide to South Africa, 18/6 to 19/6 per ton (6d. to 6⅕d. per bushel).

RAINFALL TABLE.

The following table shows the rainfall for January, 1909, and January, 1908, at the undermentioned Stations, also the average rainfall for the month of January.

Station.	For Jan., 1909.	Av'ge. Jan. R'nf'l.	For Jan. 1908.	Station.	For Jan., 1909.	Av'ge. Jan. R'nf'l.	For Jan., 1908.
Adelaide	0·74	0·85	0·29	Stockwell	0·95	0·84	0·69
Hawker	0·53	0·58	0·72	Nuriootpa	1·04	0·89	0·75
Cradock	0·23	0·65	1·24	Angaston	1·12	0·84	0·70
Wilson	0·16	0·71	1·25	Tanunda	0·94	0·91	0·62
Gordon	0·06	0·29	1·02	Lyndoch	0·56	0·91	0·53
Quorn	0·15	0·65	1·45	Mallala	0·66	0·98	0·38
Port Augusta	0·19	0·55	1·26	Roseworthy	0·70	0·87	0·47
Port Germein	0·70	0·73	1·34	Gawler	0·60	0·79	0·39
Port Pirie	0·50	0·66	1·16	Smithfield	0·46	0·77	0·29
Crystal Brook	0·43	0·68	0·50	Two Wells	0·65	0·90	0·41
PortBroughton	0·76	0·73	0·58	Virginia	0·54	0·91	0·33
Bute	0·43	0·83	0·69	Salisbury	0·68	0·85	0·27
Hammond	0·15	0·70	1·21	Tea Tree Gully	0·74	1·14	0·25
Bruce	0·11	0·27	1·19	Magill	0·88	1·04	0·25
Wilmington	0·24	0·83	1·32	Mitcham	0·86	1·01	0·32
Melrose	0·58	1·33	1·32	Crafers	1·49	1·79	0·42
BoolerooC'ntre	0·28	0·90	1·05	Clarendon	0·89	1·31	0·21
Wirrabara	0·60	0·68	1·50	Morphett Vale	0·75	1·06	0·20
Appila	0·35	0·67	1·26	Noarlunga	0·45	0·76	0·18
Laura	0·52	0·71	1·57	Willunga	0·48	0·86	0·19
Caltowie	0·37	0·70	1·32	Aldinga	0·48	0·77	0·15
Jamestown	0·42	0·69	1·35	Normanville	0·41	0·67	0·10
Gladstone	0·43	0·66	1·29	Yankalilla	0·61	0·71	0·10
Georgetown	0·46	0·71	—	Eudunda	0·62	0·88	0·71
Narridy	0·40	0·66	1·01	Sutherlands	0·24	—	—
Redhill	0·72	0·60	0·98	Truro	0·99	0·82	0·55
Koolunga	0·59	0·69	0·90	Palmer	0·56	—	0·47
Carrieton	0·17	0·74	1·17	MountPleasant	0·89	0·89	0·54
Eurelia	0·27	0·74	1·47	Blumberg	0·96	1·37	0·26
Jonhsburg	0·28	0·52	1·12	Gumeracha	1·12	1·18	0·29
Orroroo	0·25	1·13	1·26	Lobethal	1·20	1·22	0·23
Black Rock	0·20	0·71	1·19	Woodside	1·08	1·18	0·26
Petersburg	0·36	0·89	1·15	Hahndorf	1·03	1·26	0·40
Yongala	0·23	0·69	1·05	Nairne	0·81	1·20	0·30
Terowie	0·17	0·74	1·22	Mount Barker	0·86	1·12	0·32
Yarcowie	0·26	0·61	1·04	Echunga	1·10	1·28	0·22
Hallett	0·42	0·80	1·22	Macclesfield	0·94	1·12	0·17
Mount Bryan	0·26	0·34	1·20	Meadows	1·00	1·35	0·16
Burra	1·86	0·80	1·06	Strathalbyn	0·76	0·79	0·17
Snowtown	0·79	0·76	0·74	Callington	0·43	0·93	0·27
Brinkworth	0·60	0·47	0·85	Langh'ne'sBge	0·75	0·59	0·14
Blyth	1·17	0·79	0·74	Milang	0·54	0·84	0·12
Clare	0·75	0·97	0·75	Wallaroo	0·51	0·64	0·52
MintaroC'ntral	0·59	0·65	0·64	Kadina	0·35	0·61	0·50
Watervale	1·04	1·03	0·80	Moonta	0·46	0·60	0·53
Auburn	1·36	1·12	0·83	Green's Plains	0·31	0·67	0·51
Manoora	0·66	0·63	0·55	Maitland	0·46	0·68	0·57
Hoyleton	0·91	0·94	0·57	Ardrossan	0·42	0·61	0·51
Balaklava	0·70	0·86	0·70	Port Victoria	0·41	0·53	0·30
Pt. Wakefield	0·54	0·65	0·50	Curramulka	0·30	0·78	0·30
Saddleworth	0·84	0·86	0·59	Minlaton	0·37	0·58	0·25
Marrabel	0·86	0·86	0·67	Stansbury	0·68	0·75	0·16
Riverton	1·14	0·80	0·73	Warooka	0·34	0·51	0·12
Tarlee	1·33	0·89	0·62	Yorketown	0·55	0·59	0·09
Stockport	0·80	0·96	0·60	Edithburgh	0·77	0·58	0·08
HamleyBridge	0·90	0·97	0·59	Fowler's Bay	0·08	0·49	0·36
Kapunda	1·18	0·91	0·80	Streaky Bay	0·12	0·54	0·58
Freeling	0·96	0·93	0·70	Port Elliston	0·20	0·47	0·08

RAINFALL TABLE *(Continued).*

Station.	For Jan., 1909.	Av'ge. Jan. R'nf'l.	For Jan., 1908.	Station.	For Jan., 1909.	Av'ge. Jan. R'nf'l.	For Jan., 1908.
Port Lincoln	0·59	0·69	0·17	Naracoorte	0·75	0·92	0·15
Cowell	0·23	0·51	0·52	Lucindale	0·52	0·89	0·14
Queenscliffe	0·28	0·52	—	Penola	0·77	1·18	0·20
Port Elliot	0·83	0·78	0·12	Millicent	1·08	1·14	0·18
Goolwa	0·93	0·74	0·15	Mt. Gambier	1·42	1·58	0·19
Meningie	0·97	0·75	0·08	Wellington	0·51	0·98	0·10
Kingston	0·64	0·87	0·03	Murray Bridge	0·57	0·81	0·18
Robe	0·67	0·88	0·07	Mannum	0·52	0·55	0·53
Beachport	0·49	1·13	0·12	Morgan	0·38	0·57	0·63
Coonalpyn	0·91	0·86	0·14	O'rland Corner	0·26	0·59	0·37
Bordertown	0·09	0·94	0·12	Renmark	0·31	0·53	0·36
Wolseley	0·45	0·75	0·13	Lameroo	1·42	—	—
Frances	0·45	0·91	0·20				

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. Sandford & Co. report on February 1:—

Weather.—Although January is recognized as one of the hottest periods of the year, the past month was exceptionally cool, and only on two or three occasions did the thermometer exceed 100 deg. in the shade.

Commerce.—Since the resumption of business after the holidays, trade has been active and a large turnover reported. This in face of the trouble at Broken Hill, from which centre orders have practically ceased, is evidence of the prosperous condition of the agricultural community in this State, and with the fine returns now being received by farmers from the wheat harvest just gathered, there is every reason to anticipate a continuance of present activity.

Breadstuffs.—The wheat market was steady as regards prices, and the fluctuations were limited to a penny advance about the middle of the month. Farmers did not sell with any freedom, the heavy forward contracts made in October and November for January delivery having apparently satisfied their marketing desire for the time being. The new season's wheat has been arriving at the seaboard with remarkable freedom, and shipping was heavy. Flour continued quiet, with little beyond ordinary business passing.

Fodders.—Chaff-cutters have had a quiet time, owing to Victorian prices being lower, therefore securing the New South Wales orders. Mill Offal in good request, with stocks light. Feeding-grains.—Some parcels of Oats were placed for Western Australia, whilst sales locally in Algerians were fairly brisk, but White Champions were rather slow. Prime lines of Feeding-barley met with a good market; malting kinds are now about harvested and maltsters from the Eastern States are operating freely, especially in the South-Eastern District.

Potatoes and Onions.—Supplies of Potatoes from the plains and hills near to Adelaide have been disappointingly short this season, and, unfortunately, the early crop of Gambier-grown is yielding very lightly, therefore the trade operated heavily in Victoria to fill the shortages. In Onions, locally grown tubers have so far been ample to fill demands, but quantities are now cutting off.

Dairy Produce.—The strike at Broken Hill considerably hampered business in that direction, yet the produce markets here throughout were very brisk. Certainly the lessening in supplies of Butters was checked, the result of the cooler weather which has prevailed, whilst also many Northern consignments were diverted to Adelaide instead of going on to the Barrier. Unfortunately, however, quantities of top grades were not nearly sufficient to fill all South Australia's requirements, and consequently consignments found their way from Victoria. Fresh print butters came along in fair order, excepting lines that had travelled a long distance. The auction sales were unusually active, rooms being kept well cleared, best qualities displaying a firming tendency, the only dragging lots being lower-grade Creamery and off-quality store and collectors' consignments. In bulk Butters there were a couple of parcels of clearing lines to Britain, which completed the export season. Eggs.—Generally there is an easing in quotations immediately following Christmas, but with continued shipping orders on this market good clearances were effected throughout and prices well held. Cheese.—Increased business was put through for local and Western Australian orders, and as factories are not now forwarding over-freely, a decidedly firmer tone has set in, values showing an improvement of quite a penny per ℔. Bacon.—A seasonable extensive enquiry was experienced, and apart from South Australia's needs, the neighbouring States purchased here side bacon, both smoked and green. Hams had only moderate enquiry. Honey.—Apiarists are wisely not forcing sales at present low quotations, and it is generally expected that any alteration in values will be towards an improvement. In Almonds, with the exception of an occasional odd line, stocks are practically exhausted.

Live Poultry.—Evidently poulterers and restaurant-keepers are experiencing a continuance of heavy demand, resulting in their competing at auction very keenly for each pen of table birds which at all approach good condition, so that there was not only a ready sale but satisfactory prices obtained.

MARKET QUOTATIONS ON FEBRUARY 1.

Flour.—City brands, £8 15s.; country, £8 10s. per ton of 2,000 ℔.

Bran.—1s. 0½d.; Pollard, 1s. 0½d. per bushel of 20 ℔.

Oats.—Local Algerians, new season's, 1s. 11d. to 2s.; White Champions, 2s. 3d. to 2s. 4d. per bushel of 40 ℔.

Barley.—Cape, feeding, 2s. 3d. to 2s. 4d.; malting, up to 3s. 8d. per bushel of 50 ℔.

Chaff.—£3 10s. to £3 12s. 6d., f.o.b. Port Adelaide, per ton of 2,240 ℔.

Potatoes.—New Locals, £6 to £7 per ton of 2,240 ℔.

Onions.—New Locals, £6 to £6 10s. per ton of 2,240 ℔.

Butter.—Factory and creamery, fresh in prints, 1s. 0½d. to 1s. 2d.; choice separator and fine dairies, 11½d. to 1s. 0½d.; medium creamery and poor dairies, 9½d. to 10d.; well-conditioned stores and collectors, 9d. to 9¾d.; heated lots, down to 8½d. per ℔.

Cheese.—Factory makes, 6¼d. to 7d. per ℔.

Bacon.—Factory-cured sides, 9d. to 9½d. per ℔.

Hams.—11d. per ℔.

Eggs.—Loose, 9d. per dozen.

Lard.—Skins, 8d.; tins or bulk cases, 7½d. per ℔.

Honey.—Prime clear extracted, 2¼d. per ℔.; Beeswax, 1s. 1½d. per ℔.

Almonds.—Brandis, scarce, 6½d.; kernels, 11d.; mixed softshells, 5½d. per ℔.

Live Poultry.—Good table roosters, 2s. 6d. to 2s. 9d. each; light cockerels, 1s. 6d. to 2s.; hens, 1s. to 1s. 5d.; ducks, 1s. 4d. to 2s. 4d., for light to fair conditioned; geese, 2s. 6d. to 3s. 3d.; pigeons, 5d.; turkeys, 8d. to 9d. per ℔., live weight, for fair to good table birds.

AGRICULTURAL BUREAU REPORTS.

Edited by W. L. SUMMERS.

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† Only formal business transacted at the last meeting.

Reports of Meetings.

MIDDLE - NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, January 4.

Present—Messrs. Burton (chair), Petrie, Bartrum, Bird, Ryan, Thyer, and Cook (Hon. Sec.) and two visitors.

Pig-breeding and Bacon-curing.—Mr. Thyer initiated a discussion on this subject. He favoured the cross between the Berkshire and Yorkshire for the farmer. The pigs must receive careful attention. Housing should be of such character as to afford warm quarters in winter and cool in summer. He recommended a good straw thatch roof, and concrete floors to secure good drainage. Small paddocks should be sown to different crops to provide greenfeed for the pigs. When fattening he would feed the pigs three times a day. They should be fit for killing for pork after about eight days' fattening, and for bacon at fourteen days. Mr. Bartrum was of opinion that at present prices it did not pay to feed wheat to pigs.

Port Broughton, January 15.

(Average annual rainfall, 14 inches.)

Present—Messrs. Barclay (chair), Dalby, Hoar, Pattingale, Evans, Hicks, Dolling, and T. E. Pattingale (Hon. Sec.).

Takeall.—Mr. Dalby read a paper on this subject, as follows:—"So much has been seen and heard of takeall in wheat in this district during the past season that an exchange of opinions among the members of the Bureau and through the medium of *The Journal of Agriculture* will be of benefit. It is no new disease, but had visited different parts of the State at various times, more particularly in good seasons. Its worst effects are felt in scrublands—the best of scrublands, where the timber is heaviest, being especially liable. It not only affects wheat, but pasture as well, completely clearing out one of our best fodder plants, *viz.*, barley-grass, which gives place to various other less nutritious and lasting fodders, such as cockspur, thistles, wild oats, etc. Its time of duration is from five to seven years in fields which are worked on the principle of one year fallow, one wheat, and one pasture. Thus it may seriously affect three cereal crops. Its first appearance in a crop may not materially affect it, but the next crop may be a partial or total failure. It sometimes commences its ravages as early as the month of June, affecting a few plants in patches, which gradually become larger. In these patches cockspur, thistles, and wild oats seem to thrive immensely. Should the spring be a wet one this gradual dying-out of the wheat-plant continues right up to harvest, and produces what is commonly known as deadheads on the edges of the affected patches. Much diversity of opinion exists among farmers and others as to whether deadheads are the result of takeall or not. Personally I have not the slightest doubt that they are. That they are not the result of frost I am certain, for I have watched a crop disappearing day after day in all sorts of weather—dewy nights, dry nights, cold nights, and hot nights. The result is the same: the crop steadily dies out right up to the time it is ripe. It is not hot winds, as they affect the whole of the crop at once, or the rank patches, while this disease goes on just the same no matter what the weather. In 1907 I submitted a sample of the soil and a bundle of plants to the Agricultural Department, and the verdict of the analysis was that the plants were attacked by a fungus which destroyed the roots. This I believe to be correct, as I have noticed plants apparently dead after a good fall of rain make another effort to live and put out fresh roots, only to die again as soon as warm weather comes. These dead roots are often attacked by white ants, and some attribute the cause to this mischievous insect; but if such were the case we could not grow wheat at all, as we always have the white ants in our scrublands. My experience of the white ant is that it seldom attacks anything until its object dies. Having narrowed down the cause to a fungus in the soil, the point is to discover the particular kind of fungus, its cause, and its remedy, if any. This is really a subject for the chemist, though much can be done by individual experiment. I have seen a crop in one field, one half of which was fallowed and the other ploughed immediately before sowing, the fallow being badly affected, while the other half entirely escaped. The next time this field was cultivated it was all fallow; the half that was affected the previous year was not badly affected, while the other was scarcely worth reaping. Neither is cultivation a preventive, though good cultivation is advisable. It sometimes happens, however, that the land best cultivated is worst affected, as instanced this season by the crops on fallowed land being so badly attacked. Professor Perkins advocates the burning of stubble in affected fields and sowing of oats, which I believe is really good advice, as growing oats certainly does a lot of good, while burning of the straw which has been affected may do good. The great drawback to this practice is the destruction of manure and humus. Still, in our light, sandy soils I do not think humus is so greatly needed as in the heavier clay soils, while burning often cleans the land of noxious weeds and shrubs. The greater portion of the State, I believe, has been visited during the past season, more or less, by takeall, and should the State as a whole be affected as badly as this district was last season it will materially affect the prosperity of the State." The paper was well discussed, but members differed in their opinions as to the cause of takeall.

The New Cornsack. — Members expressed dissatisfaction with the new cornsacks, which they found would only hold 170 to 180 lb. of wheat. They were of opinion that the bags should be made 1½ in. longer and 1 in. wider, so that they would hold 200 lb.

Port Germein, January 9.

(Average annual rainfall, 12 inches.)

Present—Messrs. Crittenden (chair), Holman, Head, Williams, Ashby, Deer, and Blesing (Hon. Sec.).

Review of the Season.—The. Hon. Secretary read a short paper dealing with this subject. The past season had in this district been very unusual in many respects. Up to the middle of October he had registered 30½ in. of rain at Bangor, figures much in excess of any he had recorded during the past fourteen years. From the middle of October to end of year the total fall was under 1 in., compared with 6½ in. for the same period last year. Owing to the favourable nature of the winter and spring rains the harvest throughout the district promised up to beginning of October to be a record one, but the fierce hot winds of October 6 destroyed their hopes, and fields that promised twenty-five to thirty bushels per acre were good only for hay, the wheat being caught just at a critical time. In the later districts the effects of the hot winds were not so severe, as the crop benefited by the heavy rains which followed. Throughout the district it was the forward crops that suffered most, whereas usually it is the later crops that are most liable to injury by hot winds. Following the spring rains rust appeared, and practically every variety suffered, Gluyas and Carmichael's Eclipse, which have been considered as almost rustproof, suffering severely; in addition some wheats went down badly. He estimated that the yield was reduced fully one-half, and instead of twenty bushels the district would average only ten to twelve bushels. During the year he had a striking example of the effect on sowing wheat in wet land. He had put in all but five acres of a field when rain fell to the extent of half an inch during the night. As the morning was very threatening for further rain he hurried to finish this small area, but at harvest time it yielded quite one-third less than the wheat sown before the rain. The moral was: Do not drill in seed when the soil is wet and cloggy. Members generally agreed with the Hon. Secretary's views, but several attributed the failure of the crop mainly to the effect of red rust.

Port Pirie, January 9.

(Average annual rainfall, 12½ inches)

Present — Messrs. Wilson (chair), Johns, Jose, Munday, Noll, McEwin, Teague, Birks, Hawkins, Wright, Welch, Hector, Finnigan, Smith, and Stanley (Hon. Sec.).

Annual Report.—The Hon. Secretary's report showed that ten meetings had been held, with an average attendance of 11·3 members. The plan of arranging for a definite programme for the year has proved very satisfactory, none of the members having shirked the responsibility of preparing a paper when his turn arrived. Papers on the following subjects had been read:—"Harvester *v.* Stripper," "Rabbit Destruction," "Possibilities of Irrigation," "Homestead and Outbuilding of an Up-to-date Farm," "Advantages of Country Life," "Lamb-raising and Local Freezing-works," "How Can the School Help the Farm?" and "Hay and Grain." Interest had been well maintained, and the papers generally had been well discussed. Messrs. H. G. Hawkins and W. R. Wright were appointed Chairman and Hon. Secretary respectively, and a Committee was appointed to draw up a programme of business for the ensuing year.

LOWER - NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Angaston, January 13.

(Average annual rainfall, 21¼ inches.)

Present—Messrs. Ball (chair), Player, Roberts, Thorne, Sibley, Salter, Swann, Smith, Friend, Plush, Waters, and Matthews (Hon. Sec.) and eight visitors, including Mr. Geo. Quinn, Horticultural Instructor.

Homestead Meeting.—In the afternoon members and friends met at Gawler Park Orchard, the property of Captain Collins, and a very interesting time was spent examining the different trees. drying-grounds, stables, etc. Some old pear-trees were carrying splendid crops, and it was estimated that about sixty Glou Morceau trees would average six cases per tree. The well-appointed stables came in for favourable comment, and after tea had been partaken of a hearty vote of thanks was accorded to Captain Collins and to Mr. W. Giles, the manager.

Orchard Pests.—At the evening meeting Mr. Quinn gave an interesting address, dealing with the steps being taken to prevent the introduction of fruit-tree diseases, and also measures for controlling the diseases and pests now in the State. It was satisfactory to be able to say that the most careful inspection of our orchards had failed to disclose any indication of the presence of fruit-fly. He referred to the work of the local inspectors and to the procedure necessary in order to enforce action on the part of negligent orchardists. They were a good deal hampered in their work in this respect. The question of the fertilization of the Smyrna fig by the fig-wasp, and also the experimental work started in connection with the experimental orchards were dealt with. Questions on various subjects were answered. It was resolved that the attention of the Advisory Board and of the members of the district be drawn to the necessity for the Fruit Inspectors having power to serve notices upon occupiers of orchards in which codlin moth and other serious pests are found, directing them to at once take measures to suppress such pests. It was considered very desirable to avoid the delay which at present occurs through the necessity for first reporting each case and obtaining Ministerial authority to serve such notices before they have legal standing. It was pointed out that at present many orchardists pay no attention to the notices served by the Inspectors, and their gardens are a source of danger to their neighbours.

Clare, January 4.

(Average annual rainfall, 24 inches.)

PRESENT—Messrs. Jarman (chair), Bowman, Forbes, Kempster, Kollosche, Walker, J. and P. Knappstein, Stuart, Daly, McCarthy, Ivan and C. J. Radford, and Kelly (Hon. Sec.).

"DIE-BACK" IN FRUIT-TREES.—Mr. J. Kempster read a paper on this subject to the following effect:—I thought a very useful discussion could be taken up for the evening on "Die-back in Fruit-trees." For my part I would not like to say what is the cause of the disease, as so many things may have to do with it—poverty of soil, unsuitable stocks, unsuitable situations in which trees are planted. But, unlike one grower to whom I was speaking on the subject who considered that stony ground was the sole cause of the disease, you will find it on good loamy soils with a clay subsoil for three or four feet, so I think we shall have to look further than that for a solution of the disease, though it may have something to do with it. I noticed a few weeks ago in some orchards in the South-East district pear-trees very badly affected with it—in fact, some of them were almost dead. The pear was Williams' Bon Chretien. I also noticed pear-trees in other orchards in the same district—in fact, with only a road between them—on stony land without a dead piece of wood on them. The trees were all the same age, and had the same treatment from the time of planting. The trees which were so badly affected with die-back had come from an adjacent State. I suggested to them that it might be unsuitable stocks. All the other trees that were doing well had come from nurseries in this State, so when I got back to Adelaide I asked one of our leading nurserymen if unsuitable stocks would be the cause of the die-back. He said "Yes, not the least doubt of it," so it may be that the stocks on which the trees are worked are the cause of it. Then, again, you will find old pear- and apple-trees forty or fifty years of age without a dead limb on them—trees which to all appearances never have been pruned since they were planted—excepting an odd limb here and there cut out with a saw; and you will find trees close by ten or fifteen years old with die-back on them, which have been regularly pruned each year since they were planted. May we not find a cause for it in the hard pruning to which the trees are subjected? Then we come back to the soil in which they are planted, and here we may find another cause in the poverty of the soil in which the trees are growing, for we all know that if trees are not kept growing strong all over they will soon die back, and if a soil is at all poor a tree cannot grow strongly and vigorously, hence any disease that comes along soon gets hold of it, and I notice die-back is one of them. Some growers when they see the disease cut back into two- or three-years-old timber. This I find only aggravates the disease. The best remedy is to head them well back if they are very badly affected, or if only slightly to cut to a growing shoot. I have not, or at least very rarely, noticed this disease in the peach and apricot, and it seems to be mostly confined to the apple and pear.

WESTERN DISTRICT.

Bagster, January 9.

(Average annual rainfall, 12 inches.)

PRESENT—Messrs. Miller (chair), Stiggants, Hayes, Freeman, and Gravestocks (Hon. Sec.) and three visitors.

CHAPMAN WHEATSACK.—Considerable discussion on this subject took place, members having found that the new sack would not as a rule hold 200 lb., and it was suggested that as a mistake had been made by the Federal authorities in reducing the measurements of the sack farmers should petition to have a sack that would hold at least 200 lb.

Green Patch, January 4.

(Average annual rainfall, 26 inches.)

Present — Messrs. J. Sinclair (chair), J. T. and G. Sinclair, Whillas, Merchant, Gore, and Sage (Hon. Sec.).

Methods of Cultivation.—Mr. Whillas read a paper on this subject as follows:—"Not being satisfied with results for the past three harvests I wish to bring forward for discussion the question of the treatment of our land. My soil is typical of a large portion of the district. It may be described as fairly hilly land, timbered mostly with heavy sugar-gum, and in places sheaoak, also there are small patches of yaccas and heath. As with most hilly land, the soil varies considerably, but in the main is a sandy loam of from 3 to 24 inches in thickness, overlying an impervious clay subsoil. In parts there are a few inches of ironstone gravel between the soil and subsoil, and in parts granite gravel. The average rainfall is 26 inches, most of which falls in winter. Starting from virgin soil, my first harvest was fair, the second very good. No crops could be more roughly put in than these two, and I naturally thought that the land was going to produce heavy crops as soon as the Lower North practice of bare fallow and early sowing could be followed. Since then, as I have each year approximated nearer to Lower North practice, my yields have decreased, and in addition my fallow and early-sown crops have been the poorest. Results have forced me to conclude that both bare fallow and early sowing are quite unsuitable to the colder soils here, though they might be just the thing for the limestone soils of the district. It appears to me now that bare fallow only increases the wetness of the soil and helps the grass to keep the wheat under. The method of working that I am now going to try will be somewhat as follows, *viz.*, 'Crop the land for cereals every third or fourth year, leaving out to grass and sheep-grazing when not under crop; but trying to start with, in small acreages, both autumn and spring fodder crops, to be fed off just previous to seeding the cereal crop. Before seeding plough deep furrows as surface drains down all gullies and other suitable places. Start ploughing for the cereal crop only after the land has had a good soaking rain and the grass and weeds have started. Plough in narrow lands up and down the hills as much as possible, and plough fairly deep, thoroughly turning the grass under, instead of the one-inch scratching that is often done in the district. Start the drills not before the middle of May, putting in oats first in the wettest portions, then early-variety wheats, then, last, barleys, running seeding into August if necessary. Harrow well both before and after the drill. For manure use only mineral super, about 1 cwt. per acre, and use fully 60 lb. of seed per acre.' My reasons for this change of methods are as follows:—Our main trouble is that the crops lie too cold and wet in winter, receiving a check, from which they do not properly recover, especially with the slow-growing wheats. Also, with early green ploughing and with fallow we get too strong a grass growth in the crop. By the furrow drains a good deal of the heavier rains will be drained direct to the natural creeks, instead of sapping through the soil. The narrow lands up and down the hills will also improve drainage. Bare, well-worked fallow would conserve a good portion of the previous year's rain, thus making the soil wetter; whereas with grass or fodder crops fed off the high evaporative power of the grass will thoroughly dry the subsoil before the winter sets in. The grass land will not absorb the first rains to anything like the same extent as the fallow. The grass will increase the humus in the soil and thus increase the power of absorbing ammonia. It will enable the soil to hold nitrogen compounds instead of allowing them to leach out. The sheep droppings will add considerably to the nitrogen in the soil, and also will warm the soil. We have all striking examples of the beneficial results from stable manuring in our soil, and the only way we are able to use organic manure over the whole of our crops is by feeding in grass, etc., with sheep. By bare fallowing we lose a considerable feeding-value, and also a good deal of sheep manure. Some of the grasses and fodder crops will tend to bring to the surface from the subsoil a small amount of plant-food for the use of the cereal crop to follow. On a clay soil having a light rainfall bare fallow increases its nitrogen contents by firstly the absorption of ammonia from the air and rain, and secondly the oxidation of same by exposure of the soil to the air. With us there would be a loss of nitrogen by leaching. I find that the slow-growing cereals receive a much bigger check than the quick-growing in winter, and on the whole give poorer returns. I am therefore going to drop the late wheat in future. As an instance of this, last seeding in May I finished up a hundred-acre paddock of malting barley with a few acres of Yandilla King wheat, all put in under exactly the same conditions. The barley is cleaning up fully six times better than the wheat. In conclusion, I will just touch on the manure question. There is a good deal of opinion through the district that soluble super is leached out of the reach of the plant. This I do not agree with. My field experiments put it in the top place. There is sufficient lime in our soil to fix it, and, if not, there is ample iron. Water-soluble super is, I think, the cheapest form that we are able to purchase our plant-available phosphoric acid in." Members were agreed that after two or three crops had been taken off the land the returns, even if the land is left out for two years, were unsatisfactory. It was agreed that unless care was exercised the furrows for drainage would wash badly. The Hon. Secretary said he had a gutter-wash down to permanent water level in this way, yet he could not see that it had any effect in drying the land on either side. Members differed in their views on early and late wheats, some having best results from one class and others the reverse. The benefit from stable manure was admitted by all. The Hon. Secretary said he had always opposed bare fallowing in this district, advocating fallow crops. He had grown these crops with good results up to two years ago. He advocated rape for winter feed, and Early Amber cane or Kaffir corn for summer. The past season was his first experience of true winter fallowing, and the results, especially with early wheats, were better than other treatment. The damage to the crop was usually attributed to excessive moisture, but he was convinced that takeall fungus was one of the chief causes of this trouble. His experience had been similar to Mr. Whillas'—his first two crops on one field had given over twelve bushels per acre each year. The land was then left out for two years and put in again with Silver King last season, but the crop was a failure. In the next paddock his neighbour got eight bushels per acre from the same variety of wheat, the land being cropped for the second time since clearing. Members were agreed that there was much room for experimental work, being of opinion that much of the ill-success was due to not knowing how to work the land to best advantage. Seeing that they could usually get at least two good crops after clearing, it would appear that with proper treatment the land would continue to yield fair returns.

Lipson, January 2,

(Average annual rainfall, 15 inches.)

Present—Messrs. Provis (chair), Barraud, Wishart, Bratten, and Potter (Hon. Sec.).

Cutting Wheat for Hay.—Some discussion took place on the best time to cut wheat for hay. Mr. Bratten favoured cutting before all the bloom falls; he considered green hay the best. Messrs. Provis and Potter would wait until the grain had just formed, as the hay would still be green and at the same time would contain a little grain.

The New Cornsack.—All the members spoke favourably of the new sack, and although with one exception they had strongly opposed the proposed alteration, after the season's experience they considered the smaller sack superior to the old one.

Flag Smut.—Mr. Provis asked for cure for flag smut, or so-called black rust. Mr. Barraud suggested pickling with formalin, as recommended for this disease. He noticed that it was worse on loose soil, and thought that packing with the Campbell subpacker might act as a preventive.

Shannon, December 5.

Present—Messrs. Neate (chair), J. and T. Cronin, W. and H. Glover, Habner, Kain, Procter, and J. and S. Carey (Hon. Sec.).

Haymaking.—Mr. Habner read a short paper on this subject. He advised waiting until the grain was well formed before cutting. While overripe hay was not suitable for stock, it was necessary in this district to mix hay-chaff with wheaten-chaff, and there should therefore be a fair amount of grain in the hay. The paper led to considerable discussion, the supply of horsefeed being one of the most important factors in establishing holdings in a new district. Mr. Cronin did not agree with Mr. Habner; in his opinion the greener, within reason, the hay was cut the better for the stock. The Chairman said Algerian oats must be left until somewhat on the dry side, otherwise they will be bitter; while Mr. Carey contended that if cut fairly green there would be no bitter taste.

Sale of Wheat.—The Chairman suggested that where there was a number of farmers with relatively small lots of wheat to sell, it would pay to combine and dispose of it all in one large parcel, as they would realize better prices.

Rainfall.—Mr. Kain reported that the rainfall for the eleven months ending November 30 amounted to 16·8 in.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn, December 16.

(Average annual rainfall, 17½ inches.)

Present—Messrs. Bone (chair), Hill, Venning, Masters, and Cavanagh (Hon. Sec.).

Wheat Variety Tests.—Mr. Venning reported at length on results of his wheat variety tests. The wheats were sown on land that had carried five crops during the past six years. The bushes were cut just before ploughing, and the seed sown almost at once. Several of the plots were slightly affected with takeall. Yandilla King yielded 9 bushels 53 ℔. per acre; Dart's Imperial, 8 bushels 43 ℔.; King's Early, 8 bushels 27 ℔.; Gluyas, 8 bushels 3 ℔.; while the lowest return was from Pratt's Comeback, 6 bushels 28 ℔. per acre. The grain was slightly pinched on each plot, but made a good marketable sample.

Morgan, January 2.

(Average annual rainfall, 9 inches.)

Present—Messrs. R. Wohling (chair), R. Wohling, jun., Heppner, Hausler, Hempel, Hewitt, and H. Wohling (Hon. Sec.) and one visitor.

Molasses for Stock.—The Chairman reported on some experiments with molasses. He had recently lost three horses from worms, but since using molasses he had had no trouble. He mixed one pint of molasses in one gallon of water and with this damped the chaff for two horses, giving it three or four times a week. His cattle also did well on it, while the pigs took to it very readily.

Rabbits.—Mr. Hausler reported on experiments in poisoning rabbits, which had been very troublesome during the winter. Owing to there being plenty of greenfeed, the rabbits would not take strychnine or toxa. He was afraid to use phosphorus on account of the danger from fire, and had tried a new poison called vernox. This was used at the rate of 2 ℔. dissolved in ten pints of water, and then mixed with pollard and made into pellets in the usual way. The results were very satisfactory, the land being practically cleared of rabbits.

Rhine Villa, January 8.

(Average annual rainfall, 10½ inches.)

Present—Messrs. Payne (chair), Deane, Mickan, and Vigar (Hon. Sec.).

Wheat Variety Tests.—Mr. W. T. Vigar reported on the results of his experiments during the past year. The wheats were sown on fallow land, receiving 100 ℔. of super and 60 ℔. of seed per acre. On 8¼ in. of rain from seeding to harvest Federation had yielded 30 bushels; King's Early, 25¾ bushels; Dart's Imperial, 25⅙ bushels; Yandilla King, 22¾ bushels; Comeback, 21½ bushels; Carmichael's, 21½ bushels; and Marshall's No. 3, 21⅕ bushels. Members considered the results very satisfactory.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, January 5.

(Average annual rainfall, 33 inches.)

Present—Messrs. A. Jacobs (chair), T. Jacobs, G. and J. Brumby, Ricks, Smith, Lavington, C. and J. Lewis, Hicks, Brealey, Broadbent, and Curnow (Hon. Sec.) and two visitors.

Paspalum Dilatatum.—Mr. C. Lewis tabled sheaf of this grass with stems 4 to 6 ft. in length. This had been grown without irrigation on a dry piece of soil which had never produced a decent growth of peas.

Timber on Roads and Reserves.—Mr. Ricks moved that all timbers growing on main and district roads and reserves should be brought under the control of the Forest Department. This Branch had persistently advocated the conservation of the better class of timber growing on the roads and reserves, and had repeatedly brought the matter before the local Council. Their efforts were, however, vain, and the indiscriminate destruction of useful timber continued unchecked. He strongly advocated belts of timber along the road for shade and also as breakwinds. Mr. T. Jacobs supported. It grieved him to see magnificent timber cut down for the sake of a few shillings. He believed the time would come when every landowner would be compelled to plant trees. Mr. C. Lewis opposed the proposal, as it would mean that the local Council would lose all revenue from sale of wood and wattle-bark. Mr. Curnow thought it unwise to surrender any of their privileges as ratepayers, besides which they would not find the Forest Department any better than the local Council, which should have complete control of the roads in every way. If the Council would not heed the wishes of the ratepayers, the latter had the remedy in their own hands. In regard to timber on roads, he pointed out that where the roads were only one chain in width big timber was a serious menace to the adjoining landowners, especially if the land is under cultivation. Mr. Hicks thought it a mistake to allow too much timber to grow along the roads in the hills, as in the winter time the roads did not dry up enough and were consequently injured by the traffic. The majority of members opposed the motion.

Summer Fodder.—Mr. Ricks read a short paper on this subject. In view of the profits to be derived from dairying—both directly and indirectly by returns from pigs and poultry—he thought the industry should receive more attention. They would, however, have to provide greenfeed during the period from December to end of March, while the grass is dry. They could not expect their cows to keep up their supply of milk unless they were provided with the necessary greenfeed. As a permanent crop for this purpose lucerne should be grown more largely in this district. For a quick summer crop, sorghum or maize should be grown. He preferred the latter, which, however, should be cut before the stems are too hard. Mangolds could also be grown with success; planted in August or September they will stand through the summer and last twelve months if necessary. A great deal of feed can be obtained by removing the lower leaves at intervals during growth; these should be cut about an inch from the "root." If pulled off there was always a danger of injury to the "root." Another useful crop for early autumn feed is dwarf Essex rape. If sown in the early part of the year in this district it should provide good greenfeed early in the autumn. Mr. T. Jacobs generally agreed with the paper, but thought lucerne the best crop they could grow for summer feed. Where it could be irrigated it gave very heavy yields, but he would not advise sowing it except on moist ground if water could not be applied. Mr. C. Lewis agreed that it was necessary to provide greenfeed for their cows during summer, but in dry seasons this was often a difficult task. Dealing with paspalum Mr. Jos. Lewis thought they expected too much the first and second season after planting. His experience had been that when allowed to get thoroughly established it was a most valuable grass.

Clarendon, January 4.

(Average annual rainfall, 33½ inches.)

Present—Messrs. J. Spencer (chair), L. Spencer, Harper, Morphett, Tester, Dunnill, J. Wright, sen., J. Wright, jun., and Phelps (Hon. Sec.).

Local Show.—It was decided that members should provide an exhibit of produce at the forthcoming show of the local Agricultural Society, and that the proceeds from the sale of the same should be devoted to the prize fund of the Society.

Haymaking.—Some discussion on this subject took place. Members did not consider it advisable to have too large sheaves, especially with oaten hay, as there was danger of heating. The Chairman did not think there was any risk of injury if the crop was in good order when cut, and care was taken to stook it properly. More attention should be paid to the stooking of hay than was usually given.

Increasing Stock-carrying Capacity.—Mr. L. Spencer read a paper on this subject. This was a most important matter to farmers in view of the present high value for land, high wages for labour, etc. Subdivision into small paddocks so that stock can be frequently shifted to fresh, sweet pasture is of great value. In this way the field can be fed down close and the coarser growths which in large paddocks are neglected will be utilized. The small paddocks can be spelled frequently, so that when the stock comes back they provide a nice fresh growth of feed which will be relished. If they were to keep more stock they must grow more feed. They would all admit that cultivated land produces more feed than the uncultivated. Where the land is continually pastured it deteriorates, as the stock eat out the best feed first, while the rougher and less nutritious herbage is allowed to seed. He believed it would pay well to grow special crops for sheep and lambs, especially from May to July, when the natural pasture is deficient. The question of the best crop to grow was one that could only be determined by trial. He also believed it would pay to clear more of the timber off the pasture land, as one acre cleared will grow twice as much as if there is much timber on it. Paper was well discussed, and members generally agreed with its principles. It was suggested that experiments with different kinds of fodder crops in small blocks should be carried out by members.

Dingabeldinga, January 18.

Present—Messrs. F. DeCaux (chair), Trimper, Allen, Gill, and Chenoweth (Hon. Sec.).

Lime in Agriculture.—Mr. F. Gill read a paper dealing with the use and action of lime in agriculture. After dealing with the different forms in which lime is found, he referred to the action of the two commoner forms—*viz.*, sulphate and carbonate of lime. Sulphate of lime (gypsum) had a marked effect on the potash in the soil, rendering it more readily available to plants. It was also used to mix with manure and other decaying organic matter to prevent the loss of ammonia. Carbonate of lime was of greater importance to the agriculturist. It acted in various ways both mechanically and chemically, besides indirectly in assisting the bacteria in the soil to carry out their functions. Lime not only renders heavy clay soils more friable and mellow, but it has a tendency to bind light, sandy soils. The addition of sufficient lime to a clay soil will break it down and prevent the shrinking and cracking so characteristic of such soils when dry. Lime counteracts the sourness due to the presence of excess of imperfectly-decayed organic matter. The result of this sourness on undrained land is seen in the coarse, almost useless vegetation produced by such land. Lime by combining with the acid in such soils sweetens them and renders possible the growth of more useful herbage. Lime also liberates certain palnt-foods which may exist in the soil in a form in which the plants cannot make use of, and prevents the loss by leaching of soluble forms of potash, phosphoric acid, etc. Lime is necessary in soils to which sulphate of ammonia and superphosphate are applied. The best form in which to apply carbonate of lime is as caustic or burnt lime. This should be carted and placed in small heaps covered with a little soil; in twenty-four hours or more the lime will have begun to crumble, and should then be spread and harrowed or ploughed in lightly. One ton of lime per acre is a good dressing for average land; some soils will require more, and others less. Too much lime will have an injurious effect, for a time at any rate. Lime should be applied in the autumn or winter. In the discussion which followed members were agreed that the soils of this district were lacking in lime, and it was agreed that some experiments should be undertaken during the coming season to test the benefit of lime.

Golden Grove, January 7.

Present—Messrs. Robertson (chair), Angove, Maughan, Ross, and Harper (Hon. Sec.) and three visitors.

Rotation of Crops. — Mr. Angove read a paper on this subject. He pointed out that experience in other countries had shown that by growing certain crops one after the other better results could be looked for than where the same crop is grown year after year. This is called rotation, and different systems have been adopted to suit different conditions. Where the cropping is confined to the same variety of plant the crop is less vigorous and more liable to injury by insects or disease. By the growing in rotation of different crops, these insects, etc., either die owing to the absence of their host-plant or move away in search of food. A proper system of rotation economizes manure, as different plants take different constituents from the soil, or remove the constituents in different proportions. Well-arranged rotations also allow of an economical distribution of labour, whether this be applied to the cleaning of the land, the sowing of seed, or manure. Under local conditions these systems of rotations can only be profitably adapted to the smaller farms, but even where hundreds of acres are cropped much benefit could be obtained by growing different cereals in rotation. In any system of rotation peas, beans, and other crops that obtain nitrogen from the atmosphere must have a place; other crops like rape, etc., which root deeply, should be grown in rotation with wheat or other cereal. One could not of course grow unlimited quantities of peas and beans with profit, but where sheep and pigs are kept it will pay to grow a considerable proportion of such. With wheat, too, he thought it might be an advantage to change the varieties a little; it seemed only reasonable to assume that a fine, light wheat like White Tuscan did not remove plant-food in the same proportions as a large, hard variety like African Bearded. In gardening work they always found that it was unprofitable to grow the same crop year after year on the same piece of land, and he could not see why rotation was not equally beneficial with farm crops. He was satisfied that there was more to be gained by judicious rotation of crops than many farmers believed. A good discussion followed. Mr. Rose said he had not made a success of growing sorghum and melons on the fallow, as the hay crop suffered, being little better than that from freshly-ploughed land. Mr. Maughan pointed out that by growing leguminous crops in rotation with cereals the land would soon become dirty. [If a heavy crop of peas is obtained by the liberal application of seed the peas will smother most of the weeds.—Ed.] Bare fallowing could not altogether be dispensed with in this district. While he did not think there could be any difference in the constituents removed by different varieties of wheat, it seemed only natural that a heavy grower would remove more than a light variety. The Chairman thought bare fallow essential to success in wheat- or hay-growing, and pointed out that it had been proved without doubt that they could grow better crops of wheat following a crop of Galland's Hybrid wheat than after, say, White Tuscan.

Hartley, January 9.

(Average annual rainfall, 16 inches.)

Present—Messrs. Wundersitz (chair), Stanton, Pratt, Tydemann, and Bermingham (Hon. Sec.).

Wheat Varieties. — Considerable discussion took place on the results of the harvest. Members reported that yields on the whole had been very good; Federation wheat was much in favour, having proved a better yielder and easier to thresh than most wheats grown. With this wheat members found they could start stripping earlier and finish later than with other varieties. Yandilla King had yielded well, but it was tough to thrash.

Smut.—Some discussion took place on the presence of smut in the crops. Members were of opinion that generally it was safe to sow seed unpickled in dry ground, but all seed sown after rain should be pickled. Some of the members had smut in early dry-sown wheat this season, but taken on the whole there has been more smut than usual

Longwood, December 5.

(Average annual rainfall, 37 inches.)

Present—Messrs. Oinn (chair), Pritchard, Coles, Nicholls, Glyde, Roebuck, and Hughes (Hon Sec.).

Homestead Meeting.—This meeting was held at Mr. Glyde's homestead, the orchard, garden, and other matters of interest being inspected. Mr. Glyde showed some cider vinegar of good quality made from waste apples. Dealing with spraying, it was agreed that Bordeaux Mixture and Arsenate of Soda can be used together, provided sufficient lime is used—that is, practically double as much as for Bordeaux Mixture alone. Disparene has given good results for codlin moth, and adheres well to the fruit. Members preferred cleft-grafting to bark-grafting, as it gave more satisfactory results and was not so liable to blow out. Some interesting samples of fodder were shown, including a third cut of lucerne 3ft. in height from irrigated land on the hillside, buckwheat 30 in. high, Japanese millet, prairie-grass, and *Phalaris commutata.*

Morphett Vale, January 19.

(Average annual rainfall, 22½ inches.)

Present—Messrs. A. C. Pocock (chair), J. H. and E. Perry, Rosenberg, R. Pocock, Booth, Sprigg, and Christie and one visitor.

Prizes for Wheat.—A lengthy discussion took place in respect to the prizes of £100 offered by the Government for improved or new wheats. Mr. Christie tabled fine samples of Marshall's No. 3 wheat, the heads being up to 8 in. in length, and containing as many as sixty-five grains.

Fodder Crops.—Mr. E. Perry showed Amber cane 7 ft. 6 in. in height, and Mr. Rosenberg good cobs of maize grown without the aid of irrigation.

Port Elliot, January 16.

(Average annual rainfall, 20½ inches.)

Present—Messrs. H. B. Welch (chair), H. Welch, Brooke, Pannell, Green, Vince, Norsworthy, and Hargreaves (Hon. Sec.), and one visitor.

Does Poultry-keeping Pay?—Mr. Roy Brooke read a paper on this subject. Dealing first from the point of view of the farmer who keeps a few fowls to supply the house with eggs, selling any surplus to the storekeeper, his experience was that on the majority of farms the fowls were decidedly of mongrel types. Enquiry usually elicits the information that while eggs are plentiful during spring and summer, they have to be purchased during winter, when prices are high. If pure-bred fowls of good laying strains were kept instead of mongrels, they would produce eggs all the year round, and would cost no more for feed. When winter eggs range up to 1s. 6d. per dozen it is evident that the extra returns from good birds are considerable. Then, again, on the average farm there is usually one rooster to every six or more hens. These are only wasters; they eat twice as much as a hen and return nothing. Further, the hens lay better without this rooster's attentions, and the eggs keep better. Under conditions such as described any eggs which may have been laid away and sat upon by a broody hen for a few days are ruined; but infertile eggs would be uninjured. Thousands of pounds are lost annually through bad eggs, due to their being fertile. Instead of allowing so many useless roosters on the place, a good bird should be penned up with the best hens, and enough chicks reared to replace half the flock of laying hens each year. No hen should be kept longer than her second laying season, as she becomes unprofitable. The choice of the male bird is of great importance, as he has as much effect on the laying qualities of his progeny as the hens. Attention should also be paid to the question of size of eggs, as the time will undoubtedly come when eggs will be sold by weight. Already arrangements have been made to sell graded eggs guaranteed fresh and infertile in Adelaide. This was a step in the right direction, which will be taken advantage of by poultry-keepers. In regard to fowls on small areas Mr. Brooke submitted estimate of returns from two acres devoted to poultry. They could keep 1,750 fowls on that area, and with proper attention they should average 150 eggs per day, which at 9d. per dozen gives a gross return of £820 6s. 3d. To this must be added £87 15s. for sales of cockerels, old hens, etc. Feed will cost on an average 5s. 5d. per head, say £473 19s. 2d.; cost of producing 875 laying hens to replace the older hens, £164 12s.; wages at £2 per week, £104; interest on capital and incidental expenses, £65 11s. 1d.; leaving a balance of £100. This gives a profit after payment of good wages of £50 per acre. Some discussion followed, members differing in their views as to whether poultry-keeping was really profitable. In reply to question as to whether geese were profitable, the Hon. Secretary said this bird was chiefly a grass-feeder and requires but a very small amount of grain. Geese will thrive on coarse feed, are very hardy, being little affected by the weather, and remarkably free from disease. They do best where a pond or stream is available, as they obtain a good deal of food from grasses along the banks, from aquatic plants, and insects. It paid to grow a plot of barley for topping them up. Geese should be confined at night in a warm house during the cold weather.

SOUTH-EAST DISTRICT.

Mount Gambier, January 9.

(Average annual rainfall, 31½ inches.)

Present—Messrs. Sassanowsky (chair), Wedd, Cobbledick, Niquet, Dow, Engelbrecht, Innes, Holloway, Watson, and Collins (Hon. Sec.).

South-Eastern Conference.—It was decided to hold this Conference at Mount Gambier during the first week in April if convenient to the officers of the Department.

Water Supply on the Farm.—Mr. Cobbledick read a paper on this subject, as follows:—A regular supply of pure water is necessary at all times for live-stock, to enable them to thrive and keep in good condition. As this portion of the State has abundance of water underground there should be no difficulty in obtaining it and having it laid on to all paddocks and the homestead as well, for garden and domestic use. To reach the underground water is the first operation. That can be done by sinking a well or boring. If the water is not too deep a well is preferable to a bore, as there is not so much trouble in attending to the pump when it is out of order as there is when a bore is used. The best and cheapest power for working the pump is the windmill, and there are several good makes to choose from, the selection of which and the site of well or bore are matters for each farmer to decide upon according to his requirements. Four or more paddocks can be supplied by one well and windmill. A tank is necessary to act as a reservoir and to keep the stock trough filled. The size of the tank and trough is important, and they should not be too large, say of a capacity sufficient for three days. When the tank is very large it is a trouble to empty it for cleaning, and a large trough that the stock is unable to empty becomes very dirty. It is not wise to incur the expense and trouble to obtain a pure water supply and then allow it to become impure through the tank and trough being allowed to remain in a dirty condition. The trough should be cleaned out once a week, and the tank two or three times through the summer. Iron troughing and tanks are in most cases preferable to those constructed with stone and cement, as there is no danger of them cracking, and they have the advantage of being portable. Mr. Wedd agreed with what the writer said. To get an adequate supply of water for stock was the first and main trouble. Of course, in the South-East there was no scarcity of water, but many districts in the State were not so happily situated. Mr. Niquet had seen large runs in Queensland that were practically useless for want of water. One run that was thus valueless was taken up by the Winnall Bros., who put down eleven bores, and had now fifty miles of running water, and kept 250,000 sheep on the run. He also instanced the great value of Government bores on the cattle route from Birdsville to Hergott, which had revolutionized the supply of cattle for the Adelaide and Melbourne markets. Mr. Engelbrecht said that even in this district the subject was an important one. Graziers were doing away with dams, and putting down bores and erecting windmills. It paid them, and the stock did better, especially cattle. A man who had one or more bores and windmills on them could do a little irrigation, and the value of irrigation in the growing of greenfeed, etc., was incalculable. Mr. Innes said very convenient pumps for bores were now procurable, and everyone advocated bores. These pumps were very readily repaired. Mr. Dow preferred large tanks, which did not require refilling every two or three days. Mr. Cobbledick held that when the troughs were too large the water remained in them too long, and green scum came over it. Messrs. Holloway and Wedd said that if they were covered over the scum did not accumulate. Mr. Dow said the troughs were better open to the air. The Chairman thought it was well for people to cover their tanks. It was agreed that cement tanks lasted the longer, but they were more difficult to clean than iron troughs, and were always in danger of cracking. It was agreed that unless there was plenty of greenfeed water must be provided for sheep.

Lambs Dying.—Mr. Niquet said he had lost about sixty lambs this year from what appeared to be the same complaint as described recently in one of the papers. They were wether lambs that died, and did so soon after cutting and marking. They seemed in great pain and ground their teeth, ceased to eat, and died in from two to six days. It was believed that when the lambs lay down in old sheep yards and other such places they became infected with the tetanus germs. Dr. Bull advised the use of phenyl of the strength of 1 in 40 immediately after castration.

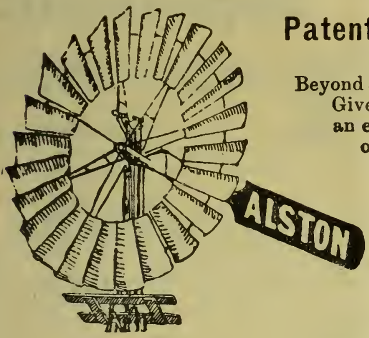
Naracoorte, December 12.

(Average annual rainfall, 22 inches.)

Present—Messrs. Coe (chair), Forster, Duffield, Caldwell, Wright, and Schinckel (Hon. Sec.) and one visitor.

Pumpkin Beetle.—Mr. Forster reported that a small beetle was destroying his melons and tomatoes; he believed it was the insect known as the pumpkin bug or beetle. He had applied sulphur to the affected plants, and so far as he could judge this had done some good. The Hon. Secretary said his melons and tomatoes were also attacked, the beetle being very much like a ladybird. [This is the banded pumpkin beetle. The best remedy is to dust the plants when damp with Paris green and lime or flour—one part of the poison to fifty parts of lime or flour. This is best applied with sulphur bellows, and care must be taken to reach the undersides of the leaves.—Ed.]

Improving Pasture Lands.—Mr. S. H. Schinckel read the following paper on the subject of "Improving Pasture Lands":—No hard and fast rule can be laid down to improve our pasture lands, owing to the great difference of soils and their natural herbage. Some are greatly improved by cultivation, with liberal application of phosphates or other manures, while with others it is not advisable to cultivate. To improve the pastures, paddocks should not be too large. Each year, if possible, one paddock should be allowed to seed well; and always avoid overstocking. On our strong lands, which are generally used for the growing of cereal crops, I do not think it advisable to sow any other grasses than the clover family. These improve the fertility of the soil, as well as providing additional food for stock. On our strong lands many varieties of catch-crops may be sown in autumn to advantage for winter food, such as rape, kale, white mustard, rye, Cape barley, oats, etc. Though these only last for a short time they greatly increase the fertility of the soil if fed off before they come to maturity. Rape gives the best return by early spring sowing. In this district we have a lot of plain country, low lying, which is rather wet in winter; also sandy ridges, in many places covered with fern. These lands are chiefly used for pasture. For the former I do not think it advisable to be too anxious to plough, particularly where the tufty grasses or rushes grow, for once these are destroyed by the plough only very ordinary grasses seem to take their place, which may be very good in spring, but are of little value when it is dry. On this class of land I do not know of any fodder I could recommend excepting *Hypochœris*, or flatweed, which grows remarkably well and improves with cultivation after it is once established. There seems to be something in this class of land to check ordinary grasses. Drainage may of course have the desired effect, as in all this class of land the water is right on the surface during the wet winter months. Then in other lands, not quite so low-lying, and minus rushes, which are greatly improved by cultivation and liberal application of phosphates—these lands may be greatly improved by the sowing of rye-grass (perennial), cocksfoot, prairie-grass, and various kinds of clovers. For our sandy or fern lands I would advise ploughing and sowing for an early feed with rape, kale, rye, mustard, barley, etc., with 1 cwt. of super and 1 cwt. of bonedust. This will provide good feed for ewes and lambs. After two or three years of such crops sow down with rye-grass, cocksfoot, prairie-grass, lucerne, clovers, paspalum, sheep's burnet, Kentucky blue, phalaris, etc., the whole seed to be mixed and sown together. All these grasses may not grow, but it will be found that with the heavy dressing of manures of the previous crops, and the manure deposited by the ewes and lambs, such inferior lands as these will be brought to very good pasture all the year round, as some of the grasses are winter grasses and some summer grasses. The Chairman referred to the different views expressed in reference to melilotus, or King Island melilot; on the one hand it was condemned as an objectionable weed, while it was claimed that three-fourths of the pasture of King Island consisted of melilot. This plant grew well on the sandy land on the coast. [The plant known in the South-East as Californian lucerne is closely allied to, if not identical with, King Island melilot.—Ed.]



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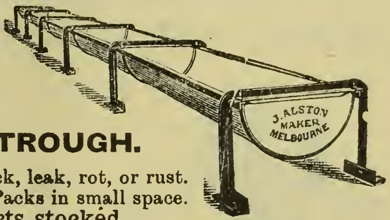

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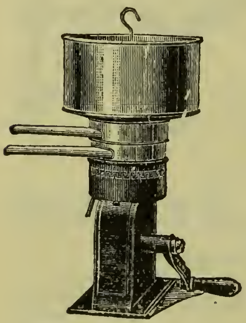

35,000 "Domo" Hand Separators sold in one year.

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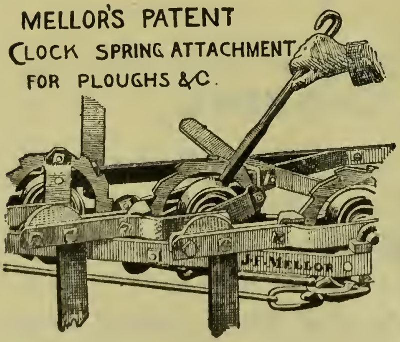
SOLE AGENTS,

Gawler Place, ADELAIDE.

It's no Cocky's Yarn.



3 HORSES

and

2 PONIES

worked a 10-furrow

Patent CLOCKSPRING SKIM PLOUGH

for Mr. C. FARROW, of Wool Bay, Y.P.

The Plough gave no trouble whatever. As level work as was ever seen.

Mr. J. RIDDIFORD, who drove it, says it is the best implement for turning fallow, and lightest draught he ever used. Cannot be beaten for stones. The cleanest fallow around.

Mellor's Patent Clockspring Ploughs have No Draught Bridles.

Springs easily wound to required tension, according to nature of ground. Each jumper is independent. No jar on horses. Jumps better than old style, and draught about 25 per cent. lighter. Takes ground quickly, and turns a good furrow.

IMPORTANT.—The Clockspring Ploughs are now being fitted with **Release Action. Impossible to hang on stumps. Draught lighter than ever.** Best Patent ever placed on a Plough. **A REAL MONEY SAVER.** A Rush of Orders has set in, so write **NOW.**

J. F. Mellor, Franklin Street, Adelaide.

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TO LAST THE LONGEST AGAINST STRENUOUS FARM WEAR, AT PRICES THAT MUST BE ON THE ECONOMICAL SIDE TO KEEP THE FARMING COST AT THE LOWEST POSSIBLE: OR, IN OTHER WORDS, FARMERS ARE LOOKING FOR **durability** AT THE **lowest market rates** IN THESE GOODS.

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WRITE US FOR ANY PARTICULARS, COLOUR CARDS, OR PRICES. IT WILL WELL REPAY YOU.

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Norwood, 253, 710, 2045.
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> "I am pleased to be able to speak very favourably of my experience so far with the Sunlight Oil Cake you sent me as a food for milking cows. I have noticed a very marked improvement in the yield of my herd since I began using it. The cows took to it readily from the first day, and do not waste a particle of it. Before giving it a trial I was inclined to doubt whether it possessed the merits claimed for it, but, after my experience, I am quite prepared to admit that it is a very valuable fodder for milking cows. Used in connection with bran and ensilage, I know of no other food which will give such good results. I shall continue to make use of it myself, and shall have much pleasure in recommending it to others."

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As SUNLIGHT OIL CAKE increases its bulk by about six times when moisture is added, it is a safer plan to give it to cattle in a mash with a handful of salt added, and mixed with other foods. A little at first crumbled in the hand and mixed with the dry chaff will get the animal accustomed to it.

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"Sunlight Oil Cake: How to use it,"

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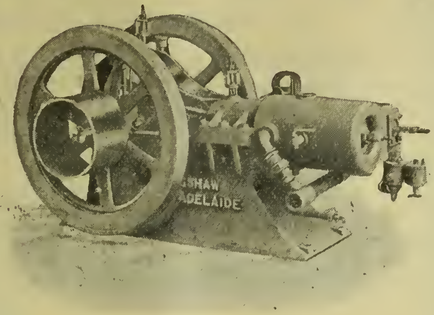
SUNLIGHT OIL CAKE

For improving butter yield.

Note the name "Sunlight" is branded on every cake.

The Farmers' Engine.

The "BAGSHAW" Petrol Engine has been specially designed to suit the requirements of S.A. Farmers.



It will drive a No. 4 "BAGSHAW" Cutter, and cut 20 to 30 cwt. per hour; also Winnower, Saw, Grinder, Sheep Shears, Pump, etc.

Don't Buy an Engine before seeing Bagshaw's Booklet. Free for the asking.

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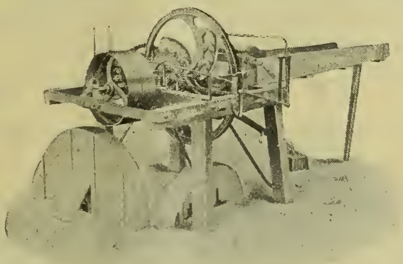
"Bagshaw" Chaffcutters.

The Outcome of Half a Century's Experience in Chaffcutter Manufacture.

Over 90 per cent. of the Chaff cut in S. A. is cut by "BAGSHAW" CUTTERS.
The Bagshaw guarantee stands behind every Machine turned out.



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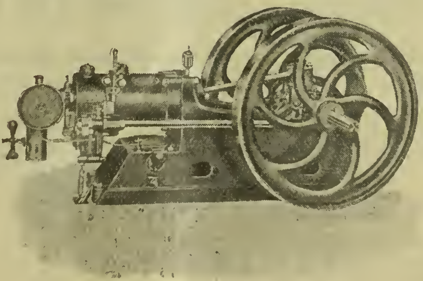
The "Allan" Oil Engine.

Twelve years in use, and not a single Engine removed for being unequal to guarantee, or unfit for the work undertaken.
A unique record.



Water Jacket cleaned without removing any working parts of Engine.
Special Safety Oil-feed, giving reduced consumption.

Don't Buy another Engine and afterwards wish you had bought an "Allan." See the "Allan" before buying. The more thorough the comparison, the better chance we have of selling you.

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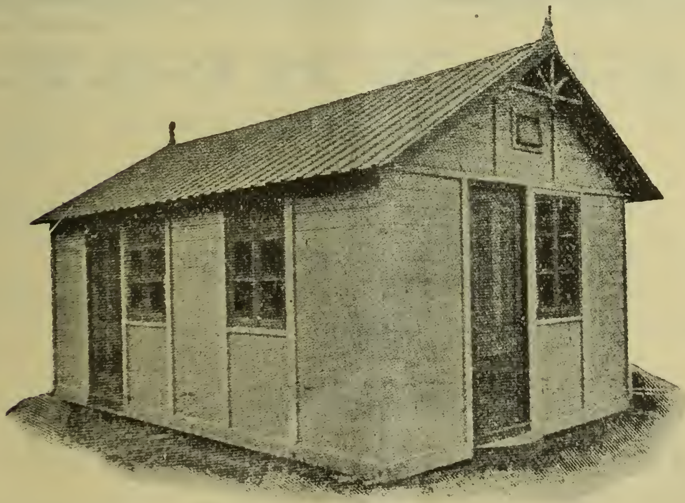

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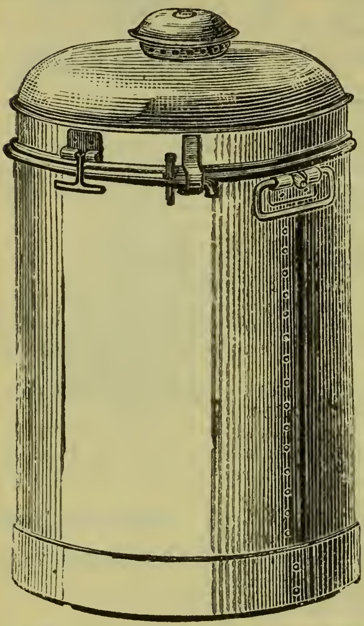

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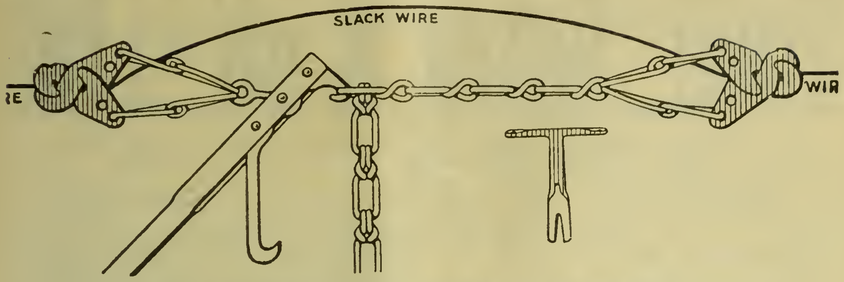

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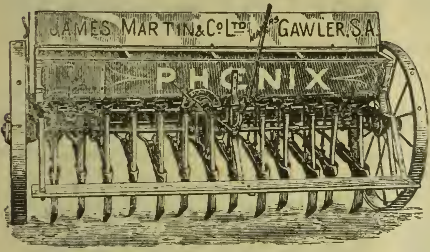
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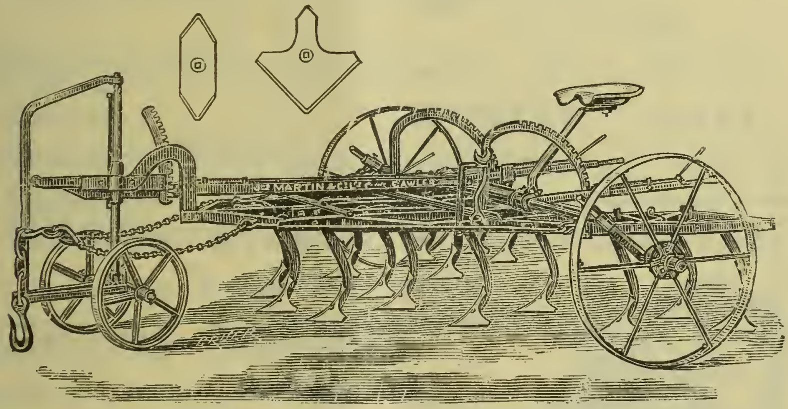
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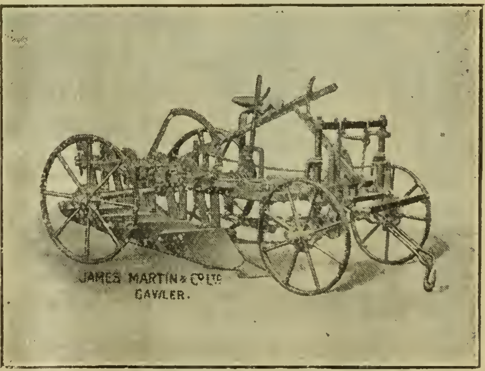

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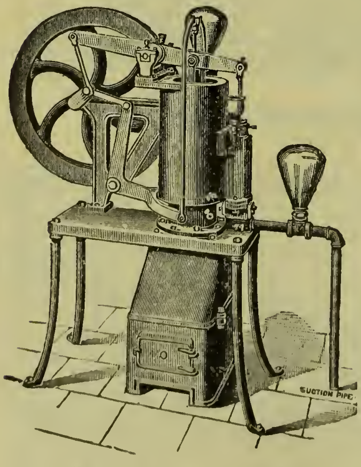

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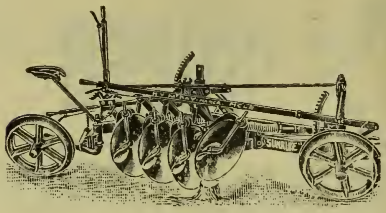

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STUMP-JUMP DISC PLOUGH.
Made in all sizes from 2- to 6-furrows.

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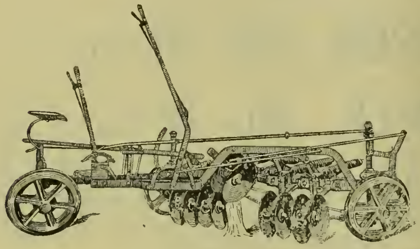

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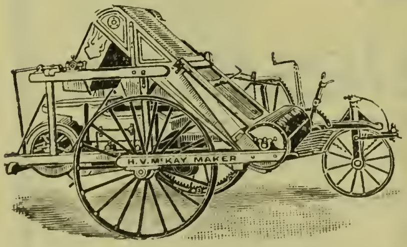

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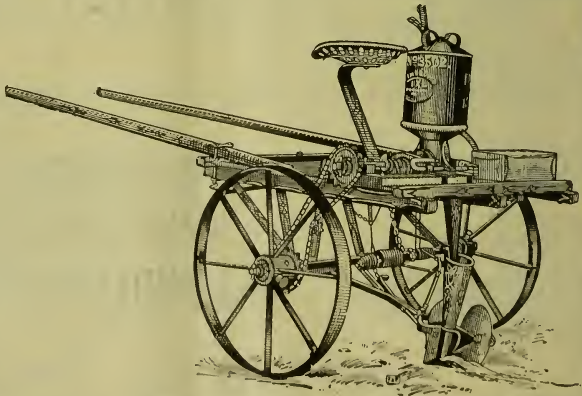

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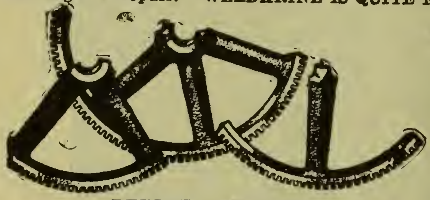
Everybody who uses Tools or Machinery has something broken occasionally. The Farmer in the midst of his harvest, loses a part of his crop because he has to wait for repairs; the Manufacturer loses hundreds of pounds, while his machinery lies idle, for a part that costs only a few shillings to repair. WELDARINE IS QUITE EASY TO USE.



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WILL COST YOU ONLY SHILLINGS & SAVE YOU MANY POUNDS.

WE GUARANTEE ABSOLUTE SATISFACTION.

Campbell's Patent "Cocktail" Twin Harrows.

for Seed-Drills and Cultivators. No harrowing required after Cultivator or Drill, thus saving a great amount of time. A great invention and a great success. Simplicity itself. Anyone can fix them. They only weigh a few pounds; are right out of the way; perfect jumpers; level the land; and cover the seed beautifully. Only one required on every other hoe. No extra draught. In damp or wet weather draught considerably lighter, as hoes can be worked same depth as in fine weather. Price, set of 7 for 13-hoe, 37s. 6d.; or 5s. 4d. each; for 13-disc, 42s. 6d.; or 6s. 3d. each. State what make Drill, and whether Hoe or Disc. Testimonials. Write to

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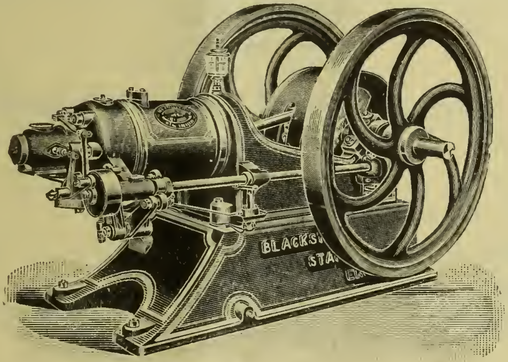
Are Sole Agents in South Australia for

The BLACKSTONE Oil-engine

which has successfully solved the problem of a **cheap, simple, and efficient** motive-power, and embodies **the Latest Improvements in Oil-engines.**

Many hundreds in use in South Australia **on farms, in chaff-mills, shearing-sheds, and all places where a cheap and effective driving-power is required.**



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Sizes from 25 to 12,000 b.h.p.

The Wolseley Sheep-shearing Machine,

the **Pioneer** of sheep-shearing by machinery, **still leads.**

Has beaten all others in open competition. The number sold largely exceeds all other makes combined. Contracts undertaken to supply complete Shearing plants.

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British-built Farm Implements. World-famous on their merits.

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We undertake contracts **to bore for water to any depth.** Have complete Steam, Oil, and Hand-boring Plants, and keep an efficient Staff of Experts for this work.

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Hand Selected Pedigree Wheats—

	Per bushel. s.	d.
KING'S EARLY (1st selection)	5	6
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Farmers can secure best results by selling their Lambs through me, as I am always in a position to treat for the entire flock.

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Apples and Pears either purchased outright or consigned on account of growers. Highest prices guaranteed

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HAMLEY BRIDGE—4th Tuesday.
MAITLAND—2nd Friday.
MURRAY BRIDGE—1st Monday.
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Sales undertaken in any part of the State.

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Fertilizers of all Descriptions

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BEST QUALITY, DRY AND FREE-RUNNING SUPERPHOSPHATE TO GO THROUGH DRILLS.

CONCENTRATED SUPERS, THOMAS PHOSPHATE POWDER, BONEDUST, BONE and POTASH MANURES.

Anchor Fencing, Fencing Droppers and Standards, "Wheel" Brand Special Temper Wire (will not stretch), Ordinary Wire (Black and Galvanized), Barbed Wire, Wire Netting, Netting Fasteners, etc.

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Cornsacks, Woolpacks, Branbags, Strychnine, Murton's Sheep Dip, "Slayo" Rabbit Poison, Rabbit Traps, Cartridges, Calf and Lamb Feeders.

Hoop Iron and Steel, Oils, Paints, Cookson's White Lead, Binder and Sewing Twines, Blue Twine a Speciality, Nobel Hamburg Explosives, Cement, etc.

THE LATEST AND BEST FARMING POWER.

DE DION BOUTON MOTOR ENGINES, as fitted by THE ADELAIDE MOTOR WORKS AND GARAGE,

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No up-to-date Farmer can afford to be without one.

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For all Classes of
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Special

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Binder Oil. Separator Oil.

Refiners, Blenders, and Importers of the Finest Russian Oils.

W. H. Burford & Sons, Ltd.,
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BURFORD'S

"Magic" Egg Preserver.

"The simplest and most effective preservative for eggs is Burford's "Magic" Egg Preserver."

EGGS WILL KEEP FOR TWELVE MONTHS.

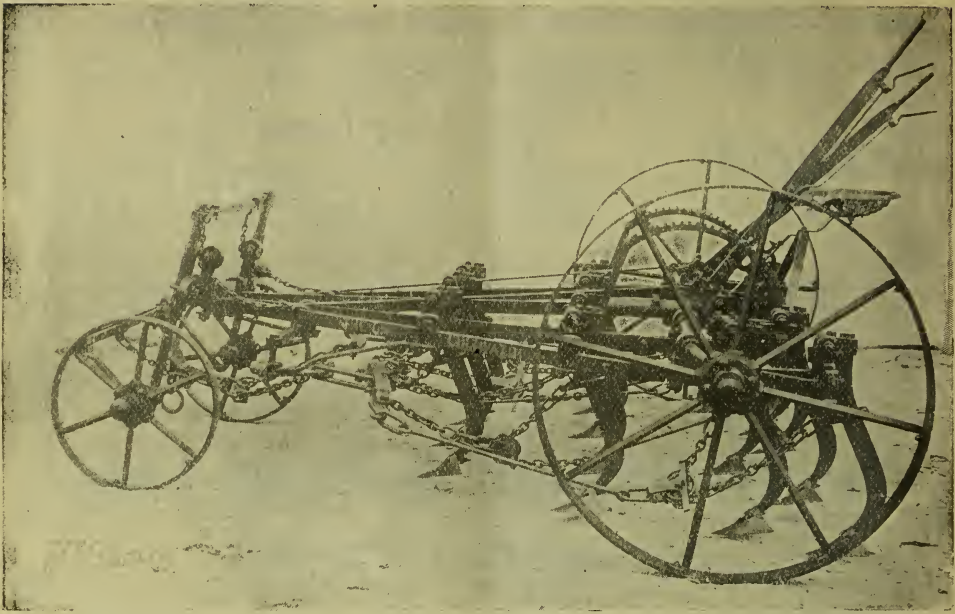
Directions.—To One Part of "Magic" Egg Preserver add Six Parts of Water and stir well. Keep the eggs covered with the Preserver, and in a cool place.

ASK YOUR GROCER TO PROCURE FOR YOU.

In Half Gallon, One Gallon, and Four Gallon Tins.

Hamley Bridge Implement Factory

J. G. TRAEGER, Proprietor.



NOTE THIS.—The "Giant" Cultivator has Patent Adjustable Tynes which can be shifted (so as to work correctly) if injured, and not leave a BONE in your Cultivating. No Patches Missed.

ALSO—All Tynes Swing on Pivots, and the Draught is directly on the Tyne, so that there is no fear of them sticking when pushed back, and is a Free Jumper, jumping over anything in moderation, and have two equalizers, so that each half of the Tynes works independently, viz., the Draught thus giving it more relief than any other device.

Maker of Patent "Giant" Stump-jump Cultivator.

Acknowledged by hundreds to be the most up-to-date Implement on the market.

Made in 9, 11, 13, 15, and 17 Tynes.

Made of Best Steel throughout. Very Light of Draught.

Scores of Testimonials from Farmers who have used them. Pronounced by many to be the best Implement they have ever used. Proof of its ability is the wonderful increase in the output each year. This Implement is known all over the Commonwealth as a real **"CLINKER."**

A Few Testimonials.

[Copy from L. O'LOUGHLIN, Esq., M.P., who purchased four Cultivators ("Giant Pattern) last season.]

Your Cultivators gave every satisfaction.—Yours sincerely, L. O'LOUGHLIN.

[Copy of Letter from D. FRENCH.]

I have finished Cultivating my Fallow with the New "Giant" Cultivator I got from you this season, and am perfectly satisfied with it. As I have had 25 years' experience amongst Stump-jump Implements, I think your "Giant" Cultivator one of the best I ever worked, both for lightness of draught and strength. I can do fifteen acres a day without hurting the horses, and it will face anything in reason you like to put it to, and if your Ploughs are as good as your Cultivators, I mean to have one later on. Yours faithfully, D. FRENCH.

To Mr. J. G. Traeger.—Dear Sir.—The 15-Tyne "Giant" Cultivator which I purchased from you has given every satisfaction, working all kinds of ground thoroughly. It has worked two seasons, and done about 1,000 acres. Yours truly, J. FORREST.

If you require a Tip-Top S.J. CULTIVATOR, don't fail to let me know.
Price-lists, etc., on application. Terms can be arranged.

NOTE THE ADDRESS

J. G. TRAEGER, Hamley Bridge, S.A.

CROWN LANDS

Auction Sales.

AT THE LAND OFFICE, ADELAIDE.

TOWN LANDS.

Thursday, February 18, 1909, at 11 a.m.

ALLOTMENTS in the Towns of BLIGH, CEDUNA, CLEVE, EDILLILIE, MAXWELL, PARILLA, PASKEVILLE, PEAKE, PINNAROO, PORT MANNUM, SEMAPHORE, SHERINGA, SHERLOCK, and WARNERTOWN.

Lessee's and Purchaser's Interest in Leases Agreements.

Thursday, March 4, 1909, at 11 a.m.

Homestead Right-of-purchase Lease—

Sections 286, 304, Wongyarra, 4 miles East from Bangor.

Agreements to Purchase—

Section 2, Bonython, 4 miles South-South-East from Ceduna.
Section 371, Booyoolie, 5 miles North-West from Laura.
Section 60, Cotton, 6 miles North-North-East from Parrakie R.S.
Section 17, Mitchell, 5 miles East from Mount Hope P.O.
Section 83, Parilla, 10 miles North from Parilla R.S.

Homestead Agreement to Purchase—

Section 880, Pirie, 4 miles East-South-East from Port Pirie.

PARTORAL LANDS.

Open to Application until Tuesday, March 2, 1909.

Blocks, comprising about 18,500 square miles of Pastoral Country in various localities, are now open to application till March 2, and all applications received in accordance with *Gazette* notice will be referred to the Pastoral Board, to be dealt with on Thursday, March 4, 1909.

Full particulars in Government *Gazette*, or obtainable, with plans, from the Surveyor-General.

Official List of Lands Open.

The attention of intending applicants for Land is directed to the Official List of Lands Open, which may be seen at the principal Post Offices, and copies obtained at the Surveyor-General's Office. The list shows the areas, localities, prices, etc., of the Sections available, and the conditions under which they may be applied for.

L. O'LOUGHLIN, *Commissioner of Crown Lands.*

Metters' All-steel Wind Motors.

Have proved without a doubt they are cheaper, stronger, and more serviceable than any other.

Write for
PRICED CATALOGUE
Relating to all Irrigation
Work to

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SUPERIOR HOE AND DISC DRILLS.

Sow Seed and Manure Evenly.

Give great satisfaction, because they are simple in construction, easily operated, and cost very little for repairs.

Fitted with Cold Rolled Steel Axle, 1½ inches in diameter. Steel Wheels, removable Bushings.

Conveniently located Oilers for all bearings.

The New Finger Fertilizer Feed has proved effective and reliable.

Ask for Price-list and Illustrated Catalogue.

NORMAN & CO., BANK STREET, ADELAIDE. Sole Importers.

PRODUCE EXPORT DEPARTMENT.

Scale of Charges to be Paid to the Department.

Produce	Treatment, &c.	Extra Storage.
Lamb	0.4d. per lb., including handling, freezing, 4 weeks' storage, and shipping	1d. per ccs. per week or any portion thereof.
Mutton	0.35d. “ “ “ 4 “ “	Do. do.
Butter	3½d. per box, including handling, freezing, 7 days' storage, and shipping	1½d. per box do.
Fruit—Apples, pears, oranges	1½d. per case “ cooling 7 “ “	1d. per case do.
Rabbits	1s. 6d. per export crate “ 3 weeks' “	1½d. per crate do.
Hares	1½d. per hare “ 4 “ “	1½d. per crate do.
Pork	0.55d. per lb. “ 4 “ “	1d. per ccs. do.
Poultry	Ducks, 8d. per hd.; Chicks, 6d. per hd.; which is a consolidated ratio, covering all shipping and selling charges. Geese and Turkeys by special arrangement	
Poultry, for storage only	3d. per crate (not exceeding 2ft.), including handling and cold storage for 7 days	1½d. per crate do.
	1d. each fowls and ducks, 2d. turkeys and geese (uncrated), including handling and cold storage for 4 weeks, or any portion thereof	
Eggs—For shipment	3½ per dozen, which is a consolidated charge, covering all shipping and selling charges	
For storage only	3d. per case for first week for eggs in shell packed in cases containing 25 dozen	2d. per case do.
Eggs in pulp	3d. per case (not exceeding 2ft.) for first week	2d. per case do.
Cheese	3d. per cwt., including handling and cool storage for 7 days	2d. per cwt. do.
Bacon	2d. per side “ “ “ 7 days	2d. per side do.
General storage	Beef, 8s. per body Lamb and mutton, 6d. per ccs. Pork and veal, 1s. per ccs. Including handling and cold storage for 4 weeks or any portion thereof.	
	Joints of meat and fish, 2/6 per cwt.	
BUTTER FACTORY—Charges for treatment of cream	1d. per lb. for Chilling, Churning, and Printing. 5 per cent. Commission for selling, etc., etc. 4d. per can cartage to and from Factory.	

Wharfage, at the rate of 1s. 6d. per ton measurement, will be charged on all produce shipped over the Department's wharf

Storage unenumerated will be specially arranged for.

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W. C. R. WARD, for the last 17 years with Messrs. W. R. Cave and Co., Elder, Smith, & Co., Ltd., and Dalgety & Co,, Ltd. W. E. ACRAMAN, late of Acraman Bros., North Coolgardie Goldfields, Western Australia, and for the last three years representing Messrs. B. Seppelt & Sons, Ltd., as their Western Australian travelling representative).

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An Efficient Fertilizer.

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As used by the Department of Agriculture at the Parafield Experimental Station.

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The "Journal of Agriculture" has a circulation of 5,300 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites. Particulars as to charges for space on application to the Department of Agriculture, North Terrace, Adelaide.

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PATENT
Grubbing Jacks
Are Made in Six Different Styles.

Farmers having ROOTS or STONES to raise, or any heavy lifting to do, are requested to write for particulars to

Trewhella Bros., Trentham, Victoria, or to any of the LEADING IRONMONGERS throughout the Commonwealth.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

Vinegrowers' Manual, by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each, or 1s. 3d. if posted.

Journal of Department of Agriculture of South Australia, 1s. per annum, in advance; 3d. per copy.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agricultural Miscellaneous: Notes on South Australian Milling Wheats; Effect of Formalin and Bluestone on the Germination of Seed-wheat; Milling Characteristics of Australian Wheats; Semi-arid America—Its Climate Compared with that of South Australia; Agricultural College, Roseworthy—Harvest Reports; Agricultural College, Roseworthy—Reports on Permanent Experiment Field; Value and Aims of Plant Pathology; Rust-resistant Wheats; Reports on Agricultural Experiments; Noxious Weeds; The South Australian Wheat Yield, season 1907-8; Improvement of Cereals; Roseworthy Agricultural; Dry-farming in America.

Chemistry and Soils: Soil Surveys; Available Plant Food in Soil; Reclamation of Land.

Horticulture—Select List of Fruit-trees; Preserving, Canning, and Drying Fruits; Fruit-preserving for Domestic Supplies; The Lemon in Sicily; Notes on the Olive; Defects in Export Apples; Apple Mussel Scale; Curculio Beetle; Valuable Grape for Export; Cider-making; Some Notes on Almonds; Production of Early Tomatoes; When to Apply Bordeaux Mixture; Fertilization of Orchard Lands; Fruit Flies; Fruit-maggot-fly Pests; The Codlin Moth; Fruit-drying for Beginners

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Poultry: Chicken-pox and Roup in Poultry.

Dairying: Milk-testing with Babcock Tester; The Dairy Cow; Taints and Flavours in Dairy Produce; Milk- and Butter-production; Milking of Cows; List of Dairy Factories; Experiments in the Hand-feeding of Cows; Instructions for Milk and Cream Suppliers.

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Fibro-Cement Roofing Slates are by far the best roofing material on the market. Eight imes cooler than iron, and four times that of Marseilles tiles. Manufactured in four colours. Ceiling- and Partition-construction-sheets. Our Ceilings are Fire-, Cold-, and Vermin-proof; no Cracks, and everlasting. Notable Ceilings are Public Institute, 994 square yards; Unley Town Hall, 567 square yards; Messrs. Foy & Gibson's, 944 square yards; Commercial Travellers' Club, 1,524 square yadrs.

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Useful Books for the Farmer.

The Book of Wheat.—An Economic History and Practical Manual of the Wheat Industry, by P. S. Dondlinger. A new and important book on the growing and handling of this the most staple food of the civilized world, and which should be in the hands of every wheat-grower in Australia. This book is the result of 15 years' personal experience of wheat-growing and from information obtained from growers all over the world. The following are the headings of some of the Chapters:—Cultivation, Harvesting, Yield and Cost of Production, Crop Rotation, Irrigation, Fertilizers, Diseases, Storage, Milling, &c. Fully Illustrated. 10s.; posted, 10s. 6d.

Artificial Manures.—How to Make, Buy, Value, and Use. A Handbook for Agriculturists Farmers, and Others, by Alfred Gibson, F.C.S.; revised by A. E. Gibson, F.C.S. This book aims at providing a plain and reliable guide which shall render an analysis certificate intelligible to practical men and assist them in obtaining full advantage of those benefits a knowledge of material at their command is able to confer. 1s. 3d.; posted, 1s. 6d.

To Manure at a Profit.—Every Man His Own Experimenter, by H. B. Buchanan and J. J. Willis. A useful book for the farmer and-wheat grower on the use of artificial manures. 9d. posted, 10d.

The Farmers' Cyclopædia of Live Stock.—A Compendium of the Science and Practice of Stock-raising, Dairying and Poultry Farming; comprising the Origin, Anatomy, Physiology, Breeding, Feeding, Diseases, Management, Marketing of Farm Stock, and the Utilization of Animal Products, by G. V. Wilcox and C. B. Smith. This is the latest and most up-to-date book on Live Stock Farming, dealing with the feeding, breeding, and care of farm animals; the treatment of animal diseases, dairy farming, and all the business features of the stock industry. It also contains a series of anatomical and physiological models especially prepared for this work. These models show in detail the exact location of all the internal organs of the body and are accompanied by an elaborate key to provide the reader with the requisite knowledge to their successful manipulation. 768 pages, strongly bound in cloth. Price, 20s.; posted, 21s. 6d.

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Applications for Prospectus, Forms of Admission, and Information should be addressed to the Secretary, Agricultural College, Roseworthy.

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THE Journal contains information of an official character relating to the Agricultural Lands, Stock, and Produce Export Departments. Illustrated articles and paragraphs by Government experts dealing with all branches of agriculture, horticulture, viticulture, pastoral matters, dairying, stock diseases, poultry, etc., are published regularly.

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The Reference Library of the Department of Agriculture, which contains so many valuable works on agricultural subjects and thousands of bulletins issued by Departments of Intelligence in all parts of the world, is at the disposal of subscribers during office hours.

Applications for enrolment on the subscribers' list should be addressed to the Department of Agriculture, Exhibition Building, Adelaide.

L. O'LOUGHLIN,

MINISTER OF AGRICULTURE.

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1,261 Stands of Shearing-machinery supplied in South Australia to the entire satisfaction of purchasers.

1,750,000 Sheep shorn in 1907 by the South Australian Branch.

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The Most Economical in first cost and in maintenance, and gives the greatest satisfaction to owner and shearer.

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HEAD OFFICE - - LONDON.

Capital Fully Subscribed, £4,000,000.

Capital Paid Up, £1.000,000. ***Reserve Fund, £270,000.***

The Company holds sales of **WOOL** throughout the season, and Weekly Auctions of SHEEPSKINS, HIDES, etc.

Fat Stock sold every week at the Adelaide Market.

Monthly Sales

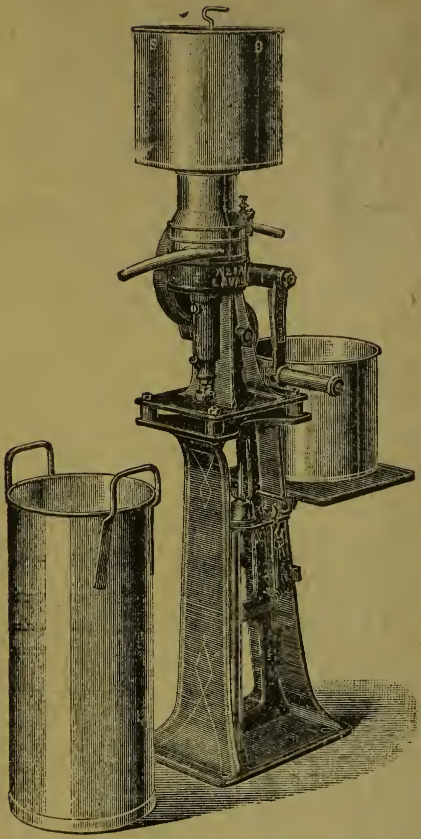
of Sheep, Cattle, etc., held at Port Augusta, Jamestown, Burra, Snowtown, and Wilmington, and various Branches throughout the South-East.

LIBERAL ADVANCES made on approved Station Properties, also on Wool, Grain, and other Produce, whether for shipment to London or for sale in Adelaide.

Fencing-wire, Woolpacks, Cornsacks, Wire-netting, and orders for Station Requisites supplied at lowest market rates.

Agencies - The White Star and Aberdeen Line of Steamers.
The Messageries Maritimes, and Shaw, Savill, and Albion Company Royal Mail Steamers.
PHŒNIX Fire Insurance Company.
QUIBELL'S Powder and Liquid Dips.
IDEAL Poison Carts.
COMMONWEALTH Union Cement.
RENBOY Sheep Brand.
KOERTZ Wool Presses and Pumps.

Consign WOOL AND GRAIN to the Company's Warehouses, Port Adelaide;
SHEEP, CATTLE, SHEEPSKINS, HIDES, ETC., to Adelaide.



How to obtain the very best results from YOUR HERD.

There is only ONE way, and that is to use for separating the milk the machine that will win from it the highest fat percentage.

There is only one machine that will do it, and that is the

New Type Alfa Laval.

Don't work any other Separator for a single day longer.

EASIEST to TURN EASIEST to CLEAN

This is sound argument — that if the machine you are working is not taking out the very highest percentage of fat, then YOU ARE LOSING MONEY at every separation.

Just because you can't SEE the fat on the skim milk PROVES NOTHING. It can be proved to YOUR satisfaction that the **New Type Alfa Laval** will take out more fat than any other machine.

A CASH ALLOWANCE made for your present Separator if you buy a NEW TYPE ALFA LAVAL.

Write at once to

A. W. SANDFORD & COMPY.,

Sole Agents, ADELAIDE.